





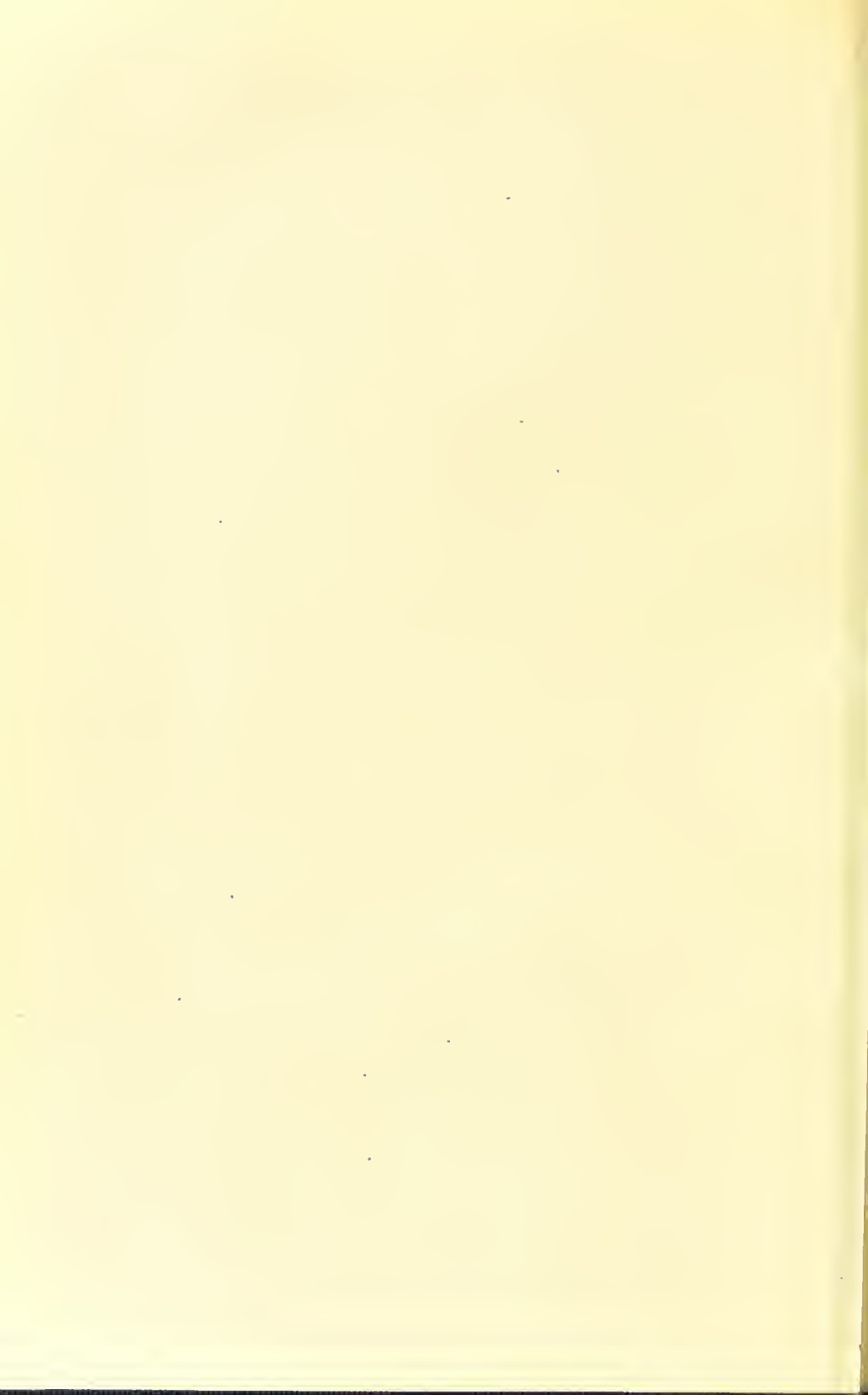
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PRACTICAL GYNÆCOLOGY

*This is a Second and Enlarged  
Edition of*

**GYNÆCOLOGICAL NURSING**

BY NETTA STEWART

# PRACTICAL GYNÆCOLOGY

A MANUAL FOR NURSES AND  
STUDENTS

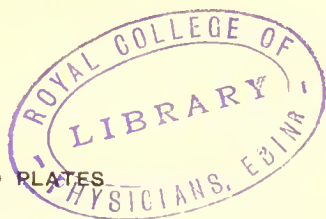
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NUMEROUS ILLUSTRATIONS AND PLATES



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To

SIR HALLIDAY CROOM

M.D., F.R.C.S.E., F.R.C.P.E., F.R.S.E.

PROFESSOR OF MIDWIFERY IN THE UNIVERSITY OF EDINBURGH

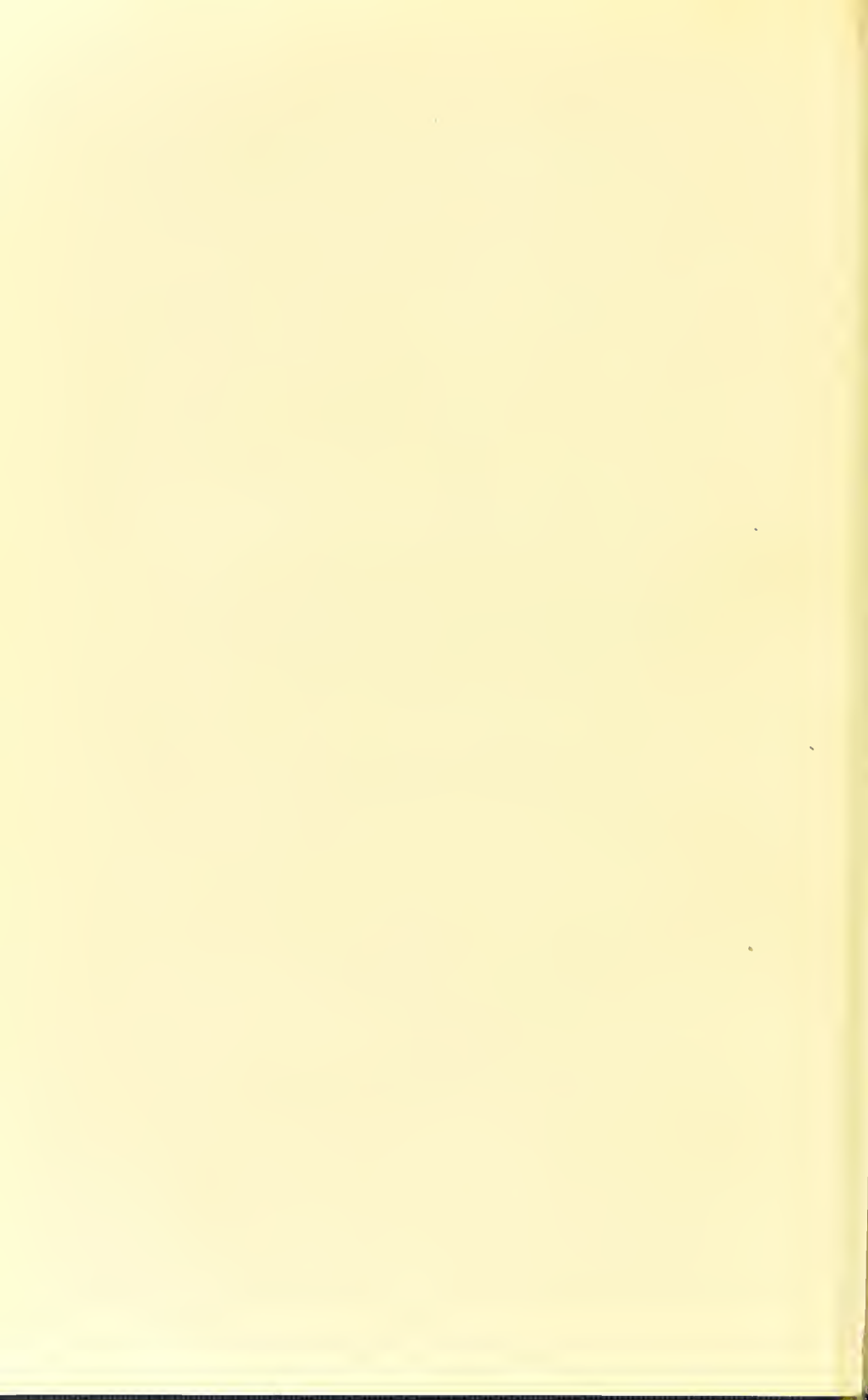
IN RECOGNITION OF HIS DISTINCTION AS A

GYNÆCOLOGIST AND HIS EMINENCE

AS A TEACHER

THIS BOOK IS

RESPECTFULLY DEDICATED



## PREFACE

THE aim which the authors have kept continually before them in the preparation of this book, is to provide a short manual of the methods of examination and treatment adopted in gynæcological practice.

In a book of this nature it was deemed inadvisable to enter at any length into the details of the operative procedures. This arrangement has permitted of greater space being devoted to the methods of preparation for, and the after-treatment of, the different operations. The non-operative measures, such as Douching, the Vaginal Tampon, etc., which occupy so important a position in Practical Gynæcology, have been described in some detail.

The authors venture to think that, by adopting this plan, they have described the common ground of gynæcological practice on which the nurse and student meet.

Whilst primarily intended for nurses engaged in gynæcological work, and for students preparing for

examinations, it is hoped that the book may be found serviceable to a wider circle of readers.

To Mr Brewis and to Dr Haig Ferguson, Gynæcologist and Assistant Gynæcologist in the Royal Infirmary, Edinburgh, the authors desire to express their gratitude for many favours.

To Dr Kelly of Baltimore we render our thanks for generous permission to use some of the figures in his well-known text-books. To Dr Barbour, also, we are indebted for some of the illustrations from Hart and Barbour's *Manual of Gynæcology*, and to Dr Haig Ferguson for the use of two of his figures.

Our sincere thanks are due to Dr Archibald M'Kendrick for kindly taking the photographs represented in the plates. The original illustrations have been prepared for us by Mr R. H. Campbell.

To the instrument-makers who have supplied us with figures we express our thanks, and especially to Messrs Gardner & Son, Edinburgh.

NETTA STEWART.  
JAMES YOUNG.

EDINBURGH, *December* 1908.



# CONTENTS

CHAP.	PAGE
I. ANATOMY OF THE PELVIS . . .	1
II. GYNÆCOLOGICAL INSTRUMENTS . . .	14
III. MICRO-ORGANISMS—INFLAMMATION—SEPSIS .	33
IV. ASEPSIS — ANTISEPSIS — STERILISATION OF HANDS, INSTRUMENTS, AND DRESSINGS, ETC.	40
V. THE EXAMINATION OF PATIENTS . . .	56
VI. THE VAGINAL DOUCHE . . . .	84
VII. THE VAGINAL TAMPON OR PLUG . . .	94
VIII. THE INTRA-UTERINE DOUCHE . . .	99
IX. THE USE OF THE CANTHARIDES BLISTER, ETC.	104
X. THE USE OF THE CATHETER . . . .	109
XI. THE EXAMINATION OF THE FEMALE BLADDER	116
XII. IRRIGATION OF THE BLADDER . . .	130
XIII. THE EXAMINATION OF THE RECTUM . . .	137
XIV. GONORRHEA . . . . .	146
XV. DISPLACEMENTS OF THE UTERUS . . .	154
XVI. PREPARATION FOR MINOR OPERATIONS .	170
XVII. CURETTAGE OR CURETTING . . . .	180

CHAP.	PAGE
XVIII. REPAIR OF THE PERINEUM, OR PERINEOR- RAPHY—PREPARATION AND AFTER-TREAT- MENT . . . . .	185
XIX. THE OPERATION OF VESICO-VAGINAL FISTULA REPAIR—PREPARATION AND AFTER-TREAT- MENT . . . . .	191
XX. VAGINAL HYSTERECTOMY . . . . .	200
XXI. PREPARATION FOR ABDOMINAL SECTION . . . . .	208
XXII. THE OPERATING ROOM . . . . .	228
XXIII. DUTIES OF ASSISTANTS DURING THE OPERA- TION . . . . .	238
XXIV. AFTER-TREATMENT OF ABDOMINAL SECTION . . . . .	247
XXV. COMPLICATIONS AFTER ABDOMINAL SECTION . . . . .	284
XXVI. DESCRIPTION AND PREPARATION OF OPER- ATING GOWNS, SHEETS, SWABS, SPONGES, ETC. . . . .	302
GLOSSARY . . . . .	317
INDEX . . . . .	321

# LIST OF ILLUSTRATIONS

## FULL-PAGE PLATES

PLATE		PAGE
I.	Patient in Dorsal Posture, prepared for Inspection of External Genitals—showing how sheet is drawn up in the centre and parts are covered by towel, until the examination is made . . . . .	<i>Face</i> 80
II.	Preparation of Patient for Operation in Lithotomy Position . . . . .	<i>Face</i> 178
III.	Patient ready for Abdominal Operation . . . . .	224
IV.	Cathcart's Appliances for Swab-counting—Figs. 1 and 2 . . . . .	<i>Face</i> 240

## ILLUSTRATIONS IN THE TEXT

FIG.		
1.	Bony Pelvis . . . . .	3
2.	Vertical Mesial Section of Female Pelvis . . . . .	9
3.	Sims' "Duckbill" Speculum . . . . .	15
4.	Auvard's Speculum . . . . .	17
5.	Fergusson Speculum . . . . .	18
6.	Cusco's Bivalve Speculum . . . . .	19
7.	Vaginal Retractor . . . . .	19
8.	Volsellum . . . . .	20
9.	Large Volsellum . . . . .	20
10.	Sir A. R. Simpson's Sound . . . . .	21
11.	Sir J. Y. Simpson's Sound . . . . .	22

FIG.	PAGE
12. Hegar's Dilator—diameters of smallest and largest instruments represented . . . .	24
13. Fenton's Metal Dilator . . . .	25
14. Sims' Dilator . . . .	25
15. Goodell's Dilator . . . .	26
16. Martin's Curette . . . .	26
17. Loop Curette . . . .	27
18. Flushing Curette . . . .	27
19. Uterine Forceps . . . .	27
20. Fritsch's Catheter . . . .	28
21. Brewis' Vaginal Perforator . . . .	29
22. Vaginal Dilator. . . .	30
23. Myoma Screw . . . .	30
24. Trochar and Canula . . . .	31
25. Pedicle Needle . . . .	31
26. Brewis' Pedicle Forceps . . . .	32
27. Instrument Steriliser . . . .	47
28. Dressing Steriliser . . . .	51
29. Casket for Dressings . . . .	52
30. Water Steriliser . . . .	55
31. Bimanual Examination . . . .	70
32. Sims' Speculum. . . .	74
33. Volsellum . . . .	74
34. Uterine Sound . . . .	75
35. Sims' Posture . . . .	81
36. Douche-can, Tubing, and Nozzle . . . .	84
37. Bidet . . . .	85
38. Section of Bidet . . . .	85
39. Syphon Douche. . . .	86
40. Higginson's Syringe . . . .	87
41. Diagram showing the Well of Lotion which collects in Roof of Vagina during Process of Douching. (After Haig Ferguson.) . . . .	93
42. Fritsch's Intra-uterine Catheter . . . .	100

# LIST OF ILLUSTRATIONS

XV

FIG.	PAGE
43. Test-tube with Catheter . . . . .	114
44. Female Bladder Sound . . . . .	118
45. Cystoscope . . . . .	119
46. Urethral Calibrator . . . . .	120
47. Bladder Forceps . . . . .	120
48. Ureteral Searcher . . . . .	120
49. Urine Evacuator . . . . .	121
50. Ureteral Catheter . . . . .	121
51. Inspection of Bladder—Cystoscope in Position, and Light supplied from Electric Lamp. (After Kelly.) . . . . .	124
52. Luy's Urine Separator . . . . .	128
53. Apparatus for Irrigation of Bladder . . . . .	134
54. Bivalve Rectal Speculum . . . . .	140
55. Kelly's Proctoscope . . . . .	141
56. Postural Examination of Rectum. (After Kelly.) . . . .	143
57. Hodge Pessary . . . . .	160
58. Albert Smith Pessary . . . . .	161
59. Ring Pessary . . . . .	167
60. Ring Pessary, with Diaphragm . . . . .	167
61. Barnes' Cup-and-Stem Pessary, with Abdominal Belt	168
62. Kelly Rubber Pad . . . . .	176
63. Lithotomy Position, showing how Legs are fixed to Uprights . . . . .	177
64. Clover's Lithotomy Crutch . . . . .	178
65. Vaginal Fistula Forceps . . . . .	195
66. Vaginal Fistula Knife—angled . . . . .	195
67. Vaginal Fistula Knife—straight . . . . .	195
68. Vaginal Fistula Needle . . . . .	195
69. Self-retaining "Winged" Catheter . . . . .	196
70. Winged Catheter—better pattern . . . . .	197
71. Urine Pan for Fistula Case . . . . .	197
72. Doyen's Volsellum . . . . .	204
73. Vaginal Retractor . . . . .	205



FIG.	PAGE
74. Broad Ligament Clamp . . . . .	205
75. Pedicle Needle-forceps . . . . .	208
76. Needle-Holder . . . . .	209
77. Brewis' Vaginal Perforator . . . . .	209
78. Keith's Glass Drainage Tube . . . . .	210
79. Myoma Screw . . . . .	210
80. Trochar and Canula . . . . .	210
81. Nelaton's Cyst Forceps . . . . .	211
82. Keith's Pressure Forceps . . . . .	211
83. Apparatus for Saline Infusion . . . . .	212
84. Lotion Jar . . . . .	231
85. Wash-hand Basins, showing Pedal Arrangement for Supply of Hot and Cold Water and for the Open- ing of Waste Pipe . . . . .	233
86. Trendelenburg Position . . . . .	235
87. Glass Flatus Tube . . . . .	264
88. Apparatus for Administration of Nutrient Enema . . . . .	271
89. Abdominal Belt . . . . .	281
90. Method of Making Self-retaining Drainage Tube . . . . .	296
91. Nurse's Cap, showing how it is drawn up by Tapes . . . . .	304
92. Nurse's Cap, showing Method of fastening on Cap . . . . .	304

# PRACTICAL GYNÆCOLOGY

## CHAPTER I

### ANATOMY OF THE PELVIS

GYNÆCOLOGY is the study of diseased conditions of the female organs of generation. To understand properly the methods of gynæcological procedure, the nurse and student must have a knowledge of the position and relations of the different structures. Besides the organs of generation, however, the study of pelvic anatomy must include the organs intimately associated with them (namely, the bladder, urethra, and rectum), the diseases of which, in the female, come under the category of Gynæcology.

The organs of generation are classified, for purposes of description, into the external organs of generation, or external genitals, and the internal organs of generation, or internal genitals, which, with the bladder and rectum, are contained within and sheltered by the bony framework called the pelvis.

**The Pelvis.**—The examination of a bony pelvis denuded of its soft parts reveals the fact that it is built up of a number of bones symmetrically arranged to form a basin, the resemblance to which has given the pelvis its name. It is composed of the innominate bones, which form its lateral and front walls, and of the sacrum and coccyx, which complete the circumference behind.

The *Innominate bones*, which take the most prominent part in the formation of the pelvic framework, are each comprised of three bones, which are separate in early life, but in adult life are fused together: (1) The iliac bone or ilium, situated above, and easily felt in part under the skin, especially in the region of its prominent upper margin, the iliac crest; (2) below and behind we have the ischium expanding below into the ischial tuberosity, upon which, with its fellow of the opposite side, the weight of the body is chiefly supported in the sitting posture; (3) below and in front we have the pubis, which sends inwards a bar of bone, easily felt under the skin. This bony bridge is jointed firmly to a corresponding bridge of bone on the other side to form the symphysis pubis. From the region of this joint the pubic bones on each side send down a narrow bridge of bone to fuse with a projection upwards of the ischial bone. Upon the narrow bar of bone thus formed the external generative organs are placed.

A glance at the figure (Fig. 1) will show how the

pubic and ischial bones, with their bony projections, enclose the aperture known as the thyroid foramen, which in the natural state is covered over by a layer of membrane.

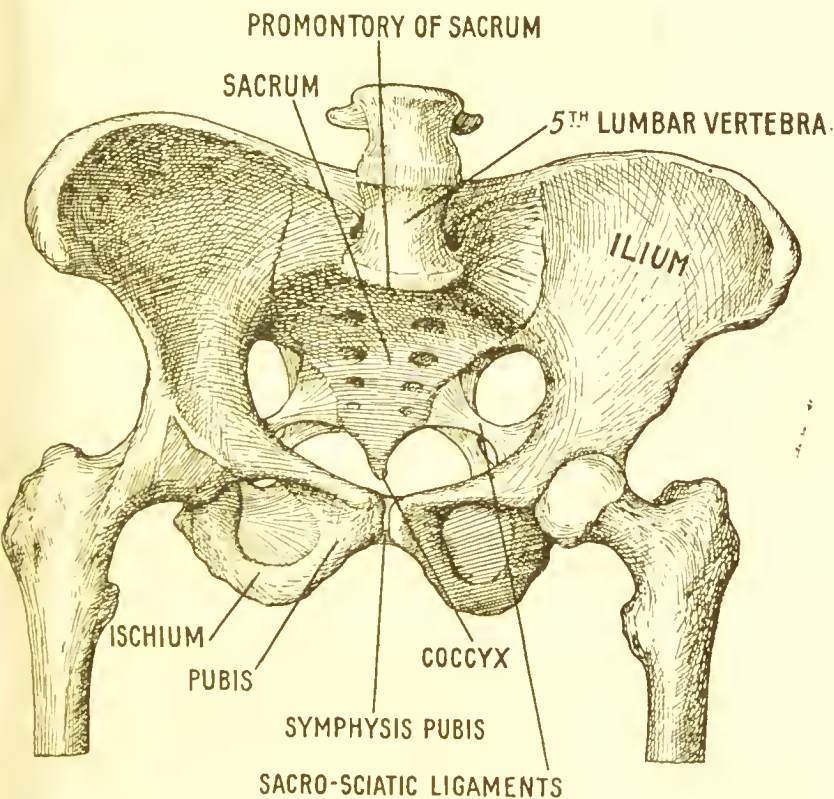


FIG. I.

On the inner aspect of the pelvis a well-marked ridge will be seen running round the entire circumference, just below the expansions of the iliac bones. This ridge is called the *Brim of the Pelvis*, and divides the pelvis into two parts, that above being

known as the false pelvis, that below as the true pelvis.

The *False Pelvis* is bounded laterally by the hollowed-out expansions of the iliac bones, and behind by the lower two (fourth and fifth) lumbar vertebræ. In front the bony circumference is interrupted, and in this region, in the natural state, the anterior boundary is formed by the soft abdominal wall.

The *True Pelvis* lies below the pelvic brim. At its upper limit the pelvic brim circumscribes the space known as the pelvic inlet. For the nurse and student of gynæcology the true pelvis is the more important part of the pelvis, containing as it does the internal organs of generation, with the bladder and rectum. It constitutes a shallow basin, the sides of which are formed of bone. In the pelvis deprived of its soft parts the floor of the basin is absent, but in the natural state it is formed by a thick layer of tissues, called the pelvic floor. The chief constituent of this soft floor is the levator ani muscle. The lower limit of the bony pelvis, which is bridged across by the pelvic floor, is called the pelvic outlet.

The walls of the cavity of the true pelvis are formed in front by the pubic bones, behind by the five sacral and four coccygeal vertebræ, fused together to form a column, continuous above with the vertebral column of the spine. The last lumbar vertebra is jointed to the first sacral vertebra, and



by this means the pelvis is, as it were, the base on which the spinal column rests.

It should be noted (see Fig. 1) that powerful ligaments stretch across in the interval between the sacrum and coccyx on the inner aspect and the ischium on the outer aspect (sacro-sciatic ligaments), and render the posterior wall of the pelvic cavity more complete.

Laterally, the walls of the pelvic cavity are formed by the ischial bones.

The *Pelvic Cavity* is shallow in front, the depth of the symphysis pubis being only  $1\frac{1}{2}$  ins. The walls gradually deepen as we pass backwards, reaching their maximum behind, a line drawn from the pelvic brim at the centre of the sacrum to the tip of the coccyx measuring  $4\frac{1}{2}$  ins.

The anterior and lateral pelvic walls are more or less straight, whereas the posterior wall is curved on itself, the sacrum and coccyx forming a curve with the concavity forwards, thus increasing materially the antero-posterior diameter of the pelvic cavity. The projection forwards of the first portion of the sacrum above narrows the antero-posterior diameter of the inlet. This projection is called the *Promontory of the Sacrum*. The projection forwards of the tip of the coccyx below likewise narrows the antero-posterior diameter of the outlet.

Immediately above and behind the thyroid foramen we see the cup-shaped depression in which the

smooth head of the femur rotates. In the erect posture the weight of the superimposed trunk is transmitted through the spinal column to the pelvis, and thence to the femora.

It should be noted that in the erect posture the pelvis is markedly tilted, and a plane coinciding with the pelvic brim, if prolonged downwards, will be found to make an angle of  $60^{\circ}$  with a horizontal line.

Having studied the anatomy of the bony framework of the pelvis, we are better enabled to understand the positions and relations of its important contents.

Roughly speaking, we may say that the contents of the pelvis, including the internal genitals—*i.e.* uterus and vagina, Fallopian tubes and ovaries—with the bladder, urethra, and rectum, are imbedded in, or slung up by, the pelvic floor already mentioned as the curtain of soft parts closing-in the pelvic outlet. The urethra, vagina, and rectum channel this soft curtain to reach the surface, the urethra in the urethral orifice, the vagina in the vaginal orifice, and the rectum in the anus. The external genitals, on the other hand, with the orifices of the urethra and anus, may be considered as moulded on the outer surface of this curtain, and are therefore closely related to the pelvic outlet.

The study of the female organs of generation is best approached by a consideration of the external genitals.

**External Organs of Generation.**—Whilst the patient rests on the back we see the prominent eminence lying in front of the symphysis pubis, covered by thick hair, which in the female ends abruptly along a line which separates clearly the region of the abdomen from the region of the external genitals. In the male, on the other hand, the hair of the pubis extends on to the abdomen, tapering to, and disappearing about, the umbilicus. This eminence is formed by a mass of fat under the skin, and is called the *Mons Veneris*.

On separating the legs, this eminence is found to become continuous with two large rounded folds of skin, covered on their outer aspect with hair. They run downwards and backwards to disappear in the region of the perineum. These folds are known as the *Labia Majora*, and, in the natural state, are apposed the one to the other. On separating these folds the inner surface is seen to be smooth and moist and uncovered by hair. We now bring into view a prominence immediately below the mons. This is the *Clitoris*, and is composed of a mass of erectile tissue. Diverging from the clitoris, and enclosing it within their folds at the upper ends, we have the two narrow projections of skin—the *Labia Minora*—which in the unmarried woman are completely concealed by the labia majora. In some cases, however, the labia minora or nymphæ, on one or both sides, are so enlarged as, even in the

unmarried woman, to project beyond the labia majora.

The labia minora run backwards and gradually disappear towards the midline, just in front of the terminations of the labia majora. In the undisturbed state the labia minora are in contact, and conceal the smooth mucous surface lying immediately within. This mucous surface is divided into two parts. In front we have the triangular surface known as the *Vestibule*, with the apex of the triangle immediately below the clitoris. At the centre of the base of the vestibule we have the elevated and puckered orifice of the *Urethra*. Behind the vestibule the smooth mucous surface is comprised of the *Hymen*, which is perforated about its centre in the *vaginal orifice* leading into the vagina. In the married woman, and especially after the birth of the first child, the hymen is torn and, in the latter case, it frequently disappears, except for a few tags of mucous membrane round the vaginal orifice.

Behind the vaginal orifice, and extending between it and the anus, we have the *perineum*. The anus, which is the external orifice of the rectum, lies in the middle line behind the perineum, and just below and in front of the tip of the coccyx, which can be easily felt under the skin.

The *anal orifice* is kept firmly closed and puckered, except during the act of defæcation, by the ring of

muscular fibres situated immediately under the skin and known as the external sphincter.

**Internal Organs of Generation—Bladder—Rectum.**—The position of these organs is most conveniently studied in a section cut through the

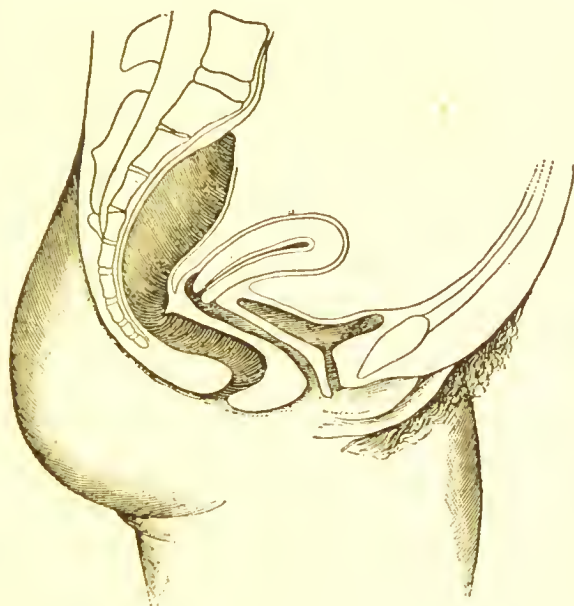


FIG. 2.—Vertical Mesial Section of Female Pelvis.

middle of the pelvis, and passing through the centre of the sacrum and the symphysis pubis (see Fig. 2).

We see that immediately behind and above the pubic bone, and entirely within the cavity of the true pelvis, there is the *bladder*. From the lowest

part of the bladder—the neck—the *urethra* passes downwards and slightly forwards to open at the orifice of the urethra, situated at the centre of the base of the vestibule.

Behind the bladder and overhanging it, especially when empty, there is the *uterus*, which is directed downwards and backwards, and projects into the roof of the *vagina*. The latter is seen to pass downwards and forwards to open at the vulvar orifice.

It will be noted that the bladder lies closely apposed to the upper part of the anterior wall of the vagina, and that the urethra is immediately in front of the lower part of the anterior vaginal wall; it is, in fact, practically incorporated with it.

Behind the uterus and vagina we have the *rectum*, which is the continuation downwards into the pelvis of the descending colon and sigmoid flexure of the large bowel.

Extending on to the upper surface of the bladder from the anterior abdominal wall we have the *peritoneum*. It runs over the bladder, then over the uterus, and dips down between the upper part of the vagina and rectum to form the *Pouch of Douglas*. It now mounts on the anterior surface and sides of the rectum.

*Bladder*.—The bladder is a muscular sac which acts as a reservoir for the urine. The urinary secretion from the kidneys passes along the two ureters, and escapes in little frequent jets from the

orifices of these ducts at the base of the bladder, These orifices are situated behind and outside the inner opening of the urethra. After a considerable amount of urine has accumulated in the bladder, it is dispelled along the urethra by the contraction of the muscle of the bladder, aided by pressure from the abdominal muscles.

Under ordinary conditions the bladder is entirely within the pelvic cavity. In the first stage of labour it is drawn up into the abdomen, and in children, as also in the distended state, it is frequently found to be an abdominal organ.

The urethra runs downwards and forwards from the neck of the bladder to open externally, as described above, its length being about  $1\frac{1}{2}$  ins.

*Uterus.*—The uterus or womb is a pear-shaped organ, consisting almost entirely of muscular tissue. The section shows its arbitrary division into two parts, divided by a slight constriction. The part above this line is called the *body*, the part below the *cervix*, or neck of the uterus. The uterus is directed downwards and backwards, and under normal circumstances the summit of the uterus (*fundus*) lies just about the level of the pelvic brim. The uterus contains a small cavity, seen in the section as a narrow slit between the anterior and posterior walls. The lower end of the cervix projects into the vault of the vagina. The vaginal portion of the cervix in the woman who has never borne a child is conical, and



at the apex of the cone the cavity of the uterus opens into the vagina as a circular orifice—the external os. In the woman who has had a child the vaginal portion of the cervix is usually more of the nature of a truncated cone, and the external os is transverse and larger. The uterus is about 3 ins. long, the cavity measuring  $2\frac{1}{2}$  ins. in length. The cavity of the uterus is lined by mucous membrane which, every menstrual period, swells up with blood and gives way in several places, allowing the distended blood-vessels to pour their blood into the uterus, whence it passes into the vagina and escapes as the menstrual flow.

When a fertilised ovum has passed from the tube, it engrafts itself in the mucous membrane of the uterus, where it is nurtured. It grows in the uterus, which expands enormously to meet the greater demands on its space, and, at full time, it is expelled by the powerful contractions of the uterine muscle, aided by the muscles of the abdominal wall.

*Vagina.*—This extends upwards and backwards from the vulvar orifice and, at its vault, suspends the uterus, the neck of which projects into it. The portion of the cervix which dimples in the vaginal vault is surrounded by a circular space that is divided, for purposes of description, into four fornices—anterior, posterior, and two lateral. The length of the vagina, from vulvar orifice to external os of the uterus, is  $2\frac{1}{2}$  ins.



*Broad Ligaments.*—If we look at the pelvic contents from above we see a fold of peritoneum extending from each side of the uterus to the side wall of the pelvis. This peritoneal fold is called the broad ligament.

*Fallopian Tubes.*—Extending out from each side of the uterus, near its summit or fundus, we have the Fallopian tubes. At their inner end they open into the cavity of the uterus. They pass outwards and upwards in the upper margin of the broad ligaments, then downwards and backwards, and open at their outer end directly into the abdominal cavity. It will thus be seen that there is a continuous channel from the vulvar orifice to the abdominal cavity through the vagina, uterus, and tube, and inflammation in any of these organs may readily spread back to the peritoneal cavity, inducing peritonitis.

*Ovary.*—The ovary on each side lies just below and behind the tube. It is an almond-shaped body, of which the function is to produce the ova, the small female germ-cells, from which the complex human organism is developed after their fertilisation by the male sperm cell. Every now and then an ovum is shed by the ovary, and is transmitted by the tube to the uterus. In its way along the tube it may be fertilised, and then, instead of being cast off in the menstrual discharge, it is arrested by the uterine mucous membrane, where it develops,

## CHAPTER II

### GYNÆCOLOGICAL INSTRUMENTS

IN this chapter it is proposed to present to the nurse and student a description of the instruments used in gynæcological practice for purposes of examination and operation.

**Vaginal Specula.**—Vaginal specula, of which a large number of different varieties exist, are devised for the purpose of enabling the gynæcologist to obtain a view of the interior of the vagina, and also to separate the vaginal walls when it is desired to operate on the vagina or uterus.

*Sims' or Duckbill Speculum.*—This instrument, as shown in Fig. 3, consists of a handle with a blade at each end set at right angles. One of the specular blades is somewhat smaller than the other, thus adapting the instrument to vaginæ of different sizes. The surfaces of the blades which face one another are convex, the outer surfaces are concave.

Before being used—and the same remarks apply

to every speculum—the instrument must be cleansed and warmed, and for ease in introduction, especially if without an anæsthetic, the convex surface of the blade must be lubricated with sterile vaseline. The concave surface must on no account be lubricated, as the efficiency of the instrument depends upon the fact that along this surface the light is reflected into the vagina, illuminating its

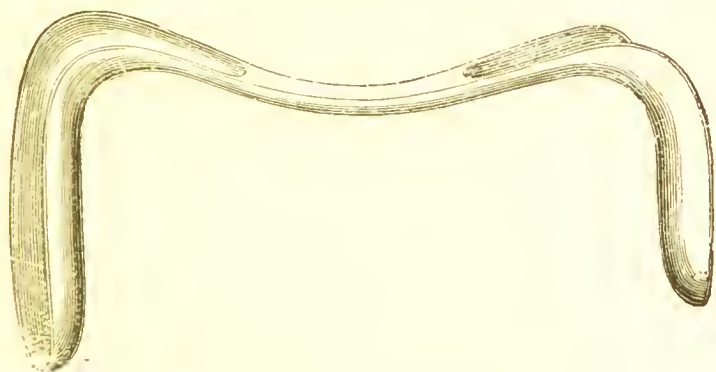


FIG. 3.—Sims' "Duckbill" Speculum.

walls and vault. Whilst using, the surgeon will be seen to move the instrument in such a way as to catch and direct the rays of light to the portion of the vagina under examination.

When employed for the purpose of making an examination without an anæsthetic, this instrument is best used in the Sims' posture (see Chap. V.). In this position the patient lies half on the face and half on the side with the pelvis higher than the head. The intestines tend to gravitate away from

the pelvis, and when the posterior vaginal wall is drawn back by the speculum, air rushes into, and balloons, the vagina.

The Sims' speculum is also frequently used in examinations or operations performed in the lithotomy position (see page 82).

To introduce the speculum, the index and middle fingers of the right hand are passed a short distance into the vagina and separated, thus enlarging the vulvar orifice. The speculum is grasped in the left hand by one of the blades and the blade to be used is gently insinuated into the vagina along the fingers of the right hand, which are now withdrawn. The instrument is pushed onwards, keeping to the posterior wall of the vagina until arrested by the posterior fornix. It is now drawn firmly backwards towards the sacrum, and by directing the light along its polished surface the walls and vault of the vagina can be explored.

*Auward's Self-retaining Speculum.*—This speculum is employed only for operations in the lithotomy position. It consists of a blade or spatula attached to a vertical piece which is fitted at its lower end with a heavy lead weight (see Fig. 4). The outer surfaces of the upright portion and weight are grooved to transmit any blood or lotion, which escapes from the vagina, into a pail placed beneath.

This is the speculum most frequently seen in operative work performed by the vaginal route. It

possesses the great advantage, by virtue of the dependent weight, of being self-retaining, and whilst in position exercises a continued downward traction

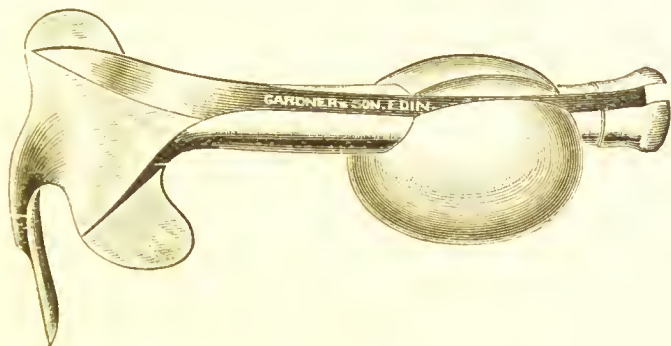


FIG. 4.—Auvard's Speculum.

on the posterior vaginal wall. Because of the considerable stretching of the parts produced, it is limited in its use to married women.

*Fergusson or Tubular Speculum.*—This speculum is supplied in three sizes. As originally made, it consists of a cylinder of glass, silvered on the inner aspect to allow of the light being thrown into the vagina. As the glass speculum is apt to crack, a better material is plated metal. The outer end of the speculum is everted like a trumpet, and the inner end is made oblique so that one side of the instrument is longer than the other (see Fig. 5).

Because of the narrow space afforded, this instrument is never used for operative purposes.

Before introduction, the speculum is cleansed and warmed and lubricated on the outer surface.

It is conveniently employed in the left lateral position (see Chap. V.). The labia and edges of the vulvar orifice are separated by the index and middle fingers of the left hand and the speculum, held in the right hand, is passed into the vagina. The light is now directed along the instrument, which is gently forced into the vagina, being slowly rotated during the process, till the cervix is seen to bulge through

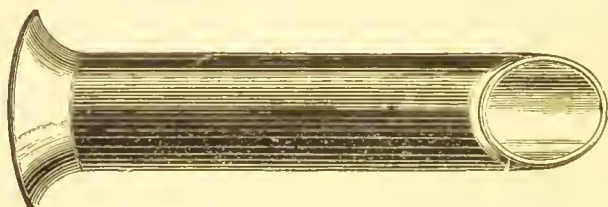


FIG. 5.—Fergusson Speculum.

the inner end. In this position the longer side is in relation to the posterior vaginal wall, the tapering end lying in the posterior fornix.

By means of this speculum the condition of the cervix is discovered, and, if necessary, caustics may be applied. Whilst being withdrawn, the vagina closes in on the end of the instrument and the condition of successive portions of the walls is ascertained.

*Cusco's Bivalve Speculum.*—This consists of two spatular blades jointed together (Fig. 6). To introduce it the labia are separated with the fingers of the left hand, and the instrument is pushed into the vagina with the blades facing laterally. When



the speculum is pushed well into the vagina the blades are turned round, and, by means of the screw, opened, thus separating the anterior and posterior vaginal walls. This speculum is used chiefly for purposes of examination, its use in operative work being limited by the small space afforded.

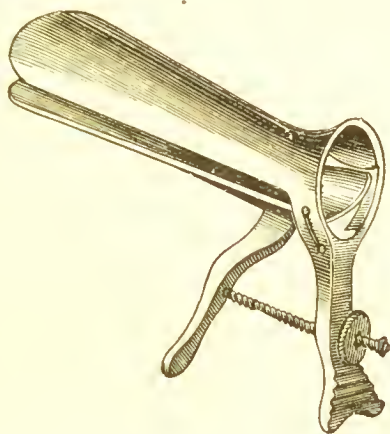


FIG. 6.—Cusco's Bivalve Speculum.

The nurse and student must not confuse this instrument with the duck-bill speculum—*i.e.* Sims'—an error which is almost excusable from the fact that the former more closely suggests the bill of the bird from which the simile is drawn. It must also on no account be mistaken for the bivalve rectal speculum, in which the blades open laterally.

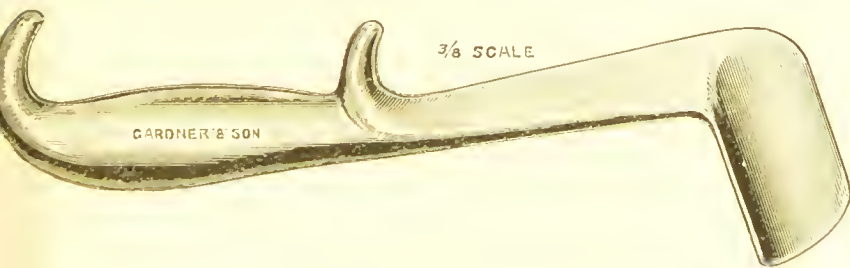


FIG. 7.—Vaginal Retractor.

A modification of Sims' speculum represented in Fig. 7 is useful as a retractor for the vaginal walls in

operations by the vaginal route. This instrument is supplied in different sizes and of different lengths of blade. Sometimes they are detachable and provided with a common handle.

**Volsellum.**—This instrument (Fig. 8) consists of catch-forceps provided with small teeth at the end



FIG. 8.—Volsellum.

of the blades for the purpose of seizing the cervix when it is desired to pull down the uterus, either for purposes of examination or operation. The cervix,

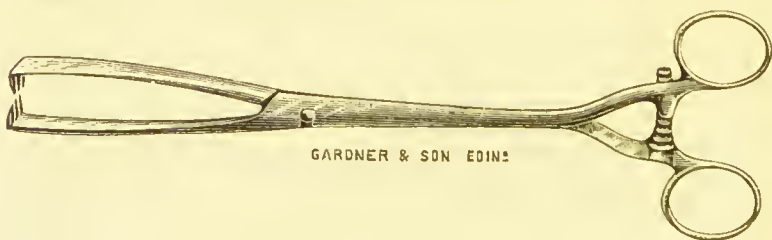


FIG. 9.—Large Volsellum.

without undue traction, can be drawn down till the os externum is at the vulvar orifice. The instrument is made with a slight curve on the blades. To pull



down the uterus, the lips of the cervix are grasped each with a volsellum, and by adapting the curves of the instruments to the parts of the patient the handles are kept well out of the way of the surgeon.

Larger volsella with straight blades and of stronger build (Fig. 9) are frequently used to pull down the uterus as it is gradually freed by the surgeon in the operation of vaginal hysterectomy (removal of uterus by vaginal route). This variety of volsellum is also employed to seize and deliver solid tumours, or the uterus itself, in abdominal operations.

**Uterine Sound.**—The sound in usual employment in the Edinburgh School is that of Sir A. R. Simpson (Fig. 10).

It is a rod of nickel-plated copper, narrowing slightly to a bulbous point, and easily bent into the shape desired. It is provided with a flattened handle roughened on one side to indicate the position of the point of the instrument when *in utero*. It is graduated with a single ridge at a distance of



FIG. 10.  
Sir A. R. Simpson's  
Sound.

$2\frac{1}{2}$  ins. from the point—the normal length of the uterus—with a groove at  $3\frac{1}{2}$  ins., and double ridge at  $4\frac{1}{2}$  ins.

This instrument is a modification of the sound devised by Sir J. Y. Simpson, which is much longer and graduated up to  $8\frac{1}{2}$  ins. (Fig. 11). The smaller instrument is long enough for ordinary purposes, and possesses the advantage of being easily held in position when it is desired, with the sound *in utero*, to examine the uterus between the left hand on the



FIG. 11.—Sir J. Y. Simpson's Sound.

abdomen and the two fingers of the right hand in the vagina (Bimanual Examination). In this manipulation the smooth surface of the handle of the sound rests in the palm of the right hand.

The sound is employed for two different sets of purposes. It may be used for the purpose of *examination*, to determine the length of the uterus (normal length is  $2\frac{1}{2}$  ins.), the position of the uterus, *i.e.*, whether it is looking forwards or backwards, the mobility of the uterus, and the condition of its mucous membrane, and in some cases the presence of growths in the uterine cavity. It may also be used for purposes of *treatment*. It is sometimes

employed to convey medicament to the interior of the uterus on a piece of wool rolled round the end of the instrument. In other cases, when the uterus is displaced backwards, it may be manipulated forwards into position with the sound *in situ*.

The use of the sound must be accompanied with the strictest attention to asepsis, as any infection introduced into the uterus may originate severe inflammatory trouble. Before being used, the sound must be sterilised by boiling or immersion for a minute or so in pure phenol or pure lysol, and then transferred to sterile water, care being taken to remove the antiseptic. The external genitals and vagina must be thoroughly cleansed to eliminate the possibility of the instrument being contaminated before reaching the uterus.

*Method of Introduction.*—This is easy when the uterus is drawn down by volsella, and the genitals are widely separated for purposes of operation. In the consulting-room, when used for purposes of examination, the procedure is more difficult. The index and middle fingers of the right hand are passed along the anterior vaginal wall to the anterior lip of the cervix, and, guided by them, care being taken to enter the vulvar orifice without touching the parts, the sound is passed into the external os of the cervix, the handle being held in the left hand.

*Precautions.*—The sound must on account be passed if the patient has missed a period *until the*

*existence of pregnancy is excluded.* Abortion may otherwise be accidentally induced. The sound should as far as possible never be employed in conditions of acute inflammation of any of the pelvic organs, and its use must be avoided in cancer of the cervix or body of the uterus, where the passage of the sound may provoke hæmorrhage.

**Dilators.**—Dilators are employed to dilate the canal of the cervix for the purpose of stretching that canal when it is unduly narrowed (stenosis of the cervix), or for the purpose of gaining access to the interior of the uterus for examination or treatment. Dilatation of the cervix is usually performed under a general anæsthetic.

*Hegar's Dilators* (Fig. 12) consist of rods of vulcanite tapering slightly towards the point, and are

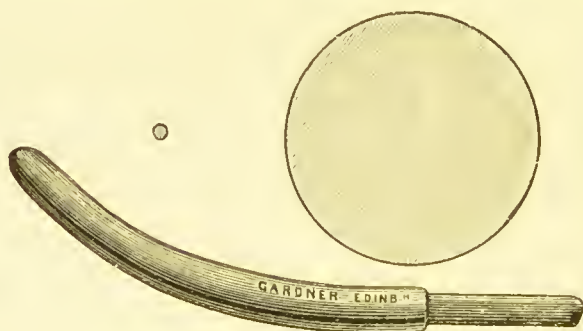


FIG. 12.—Hegar's Dilator—diameters of smallest and largest instruments represented.

obtained in sets mounting in slow gradation from an extremely small diameter to a diameter of 1 in.

*Metal Modifications of Hegar's Dilators* (Fig. 13) are more serviceable, and permit of more thorough sterilisation by boiling. They are supplied in sets,

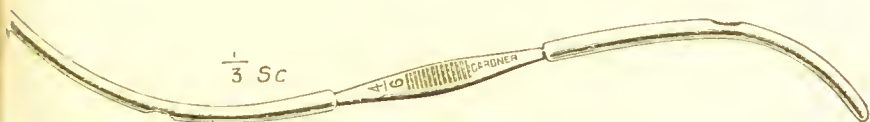


FIG. 13.—Fenton's Metal Dilator.

each instrument being usually provided with two dilators, the one larger than the other in immediate succession.

*Sims' Dilator*.—This consists of an instrument provided with three blades which can be gradually and forcibly separated by means of the running screw on the handles (Fig. 14). By this means rapid

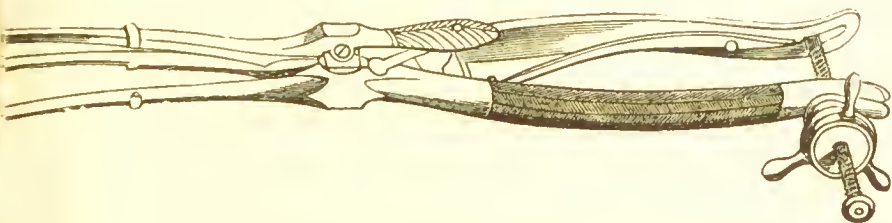


FIG. 14.—Sims' Dilator.

and efficient dilatation of the cervix may be obtained. In practice it is often necessary to dilate the cervix with the smaller graduated metal dilators to a sufficient diameter to permit of the introduction of Sims' dilator.

*Ellinger's Dilator* and *Goodell's Dilator* are based on

the same principle as that of Sims', but they are provided with only two blades (Fig. 15).

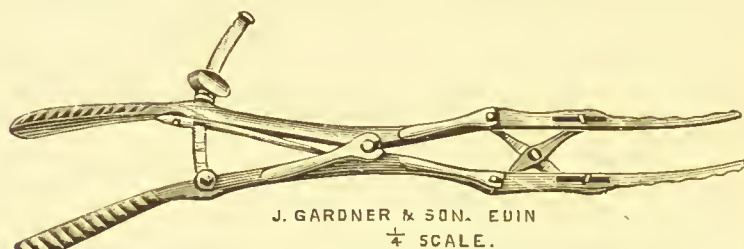


FIG. 15.—Goodell's Dilator.

**Curette.**—The curette is devised for the purpose of scraping the walls of the uterine cavity (curettage) to remove the mucous membrane when inflamed (endometritis), or to obtain a specimen of the mucosa for microscopic examination when malignant disease is suspected. It is also used to remove any fragments of placenta or membranes left in the uterus after an abortion (incomplete abortion).

*Martin or Recamier-Roux Curette.*—This instrument consists of a long metal shaft provided at each end with a sharp elongated scooping surface (Fig. 16).



FIG. 16.—Martin's Curette.

One end is somewhat smaller than the other, thus adapting the instrument to canals of different diameter.

*Loop Curette.*—As the name implies, this instru-



ment is provided with a looped end, the edges of which are either sharp or blunt (Fig. 17).



FIG. 17.—Loop Curette.

*Flushing Curette.*—This consists of a hollow shaft, the bore of which opens out by means of several small apertures on the surface of the curette (Fig. 18). The scraping edges are usually blunt, and the instrument is especially useful in cases of incomplete abortion. By being attached to the tube of a douche-

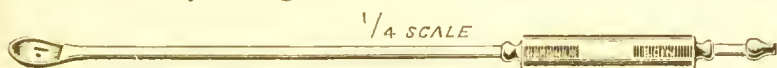


FIG. 18.—Flushing Curette.

can a constant stream of hot lotion is carried into the cavity of the uterus, thus washing away the detached fragments of placenta or membranes, and at the same time, by virtue of the heat, arresting the hæmorrhage which in such cases is apt to be severe.

*Uterine Forceps.*—As indicated in the fig. (Fig. 19),

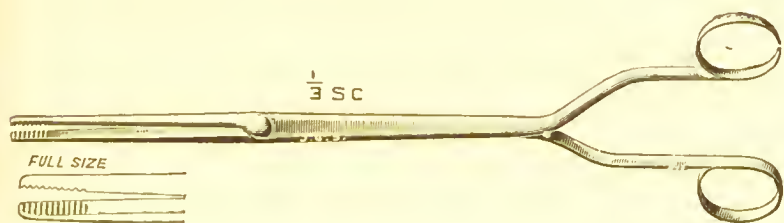


FIG. 19.—Uterine Forceps.

this consists of forceps with long narrow blades, and is convenient for holding a small piece of wool used

for swabbing out the uterine cavity, or for applying some medicament to the interior of the uterus. It is also valuable for pushing into the uterus or vagina a plug of gauze to arrest hæmorrhage, etc.

**Uterine Catheter.**—This instrument consists of a tube, which is fixed to the rubber tubing of a douche-can or Higginson's syringe when it is desired to give an intra-uterine douche. It may be made of a length of glass tubing bent at an obtuse angle near one end, which is provided with a number of lateral perforations.

*Fritsch Catheter.*—This consists of a long metal tube with a double curve, and is fitted to the tub-

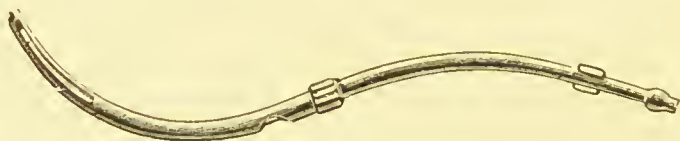


FIG. 20.—Fritsch's Catheter.

ing of a douche-can or Higginson's syringe. Over the uterine end of this there is screwed a shorter perforated tube, by which the lotion is carried back from the uterus (Fig. 20). By this two-way arrangement the possibility of the fluid collecting in the uterus under tension, with the consequent danger of the lotion being forced on into the Fallopian tubes and peritoneal cavity, is avoided.



The foregoing instruments are seen in almost daily use in any gynæcological ward. It is now proposed to describe shortly a few of the instruments devised for special operative procedures.

*Vaginal Perforator*.—This consists of long forceps the blades of which are provided with a curve that adapts them to the curve of the pelvic cavity (Fig. 21).

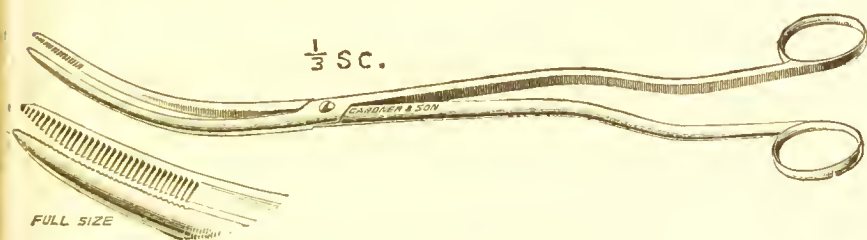


FIG. 21.—Brewis' Vaginal Perforator.

The tips of the blades are somewhat pointed, and the forceps is used to perforate the vault of the vagina for the purpose of evacuating an abscess in that region, or when, in the course of an abdominal operation, it is desired to pull a piece of gauze or tubing through into the vagina for purposes of drainage.

*Vaginal Dilator* (Fig. 22).—This consists, as usually recommended, of a cylinder of glass rounded at the inner end, which is provided with a small perforation. The outer end is large and everted, with prominent lips. The dilators are usually supplied in sets of three different sizes, and are employed for the purpose of obtaining gradually increasing dilatation of an abnormally narrow vagina. They are

used for an hour or two morning and night, either independently or subsequent to an operation. By means of the small inner opening any vaginal discharge may escape, and, by attaching tapes to two

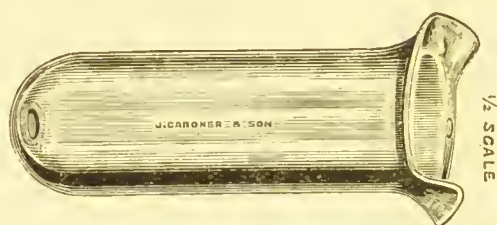


FIG. 22.—Vaginal Dilator.

holes in the sides of the everted lips, the instrument may be kept in position. The front of the lower everted end is moulded to bridge across the region of the urethra, thus avoiding undue pressure.

*Myoma Screw.*—This is an instrument shaped like a corkscrew, and used to impale and deliver a fibroid



FIG. 23.—Myoma Screw.

tumour into the wound in an abdominal operation (Fig. 23).

*Trochar and Canula.*—This instrument, as shown

in the figure (Fig. 24), consists of the trochar and canula so frequently used in ordinary surgical practice. It has been modified in gynæcological practice, and is employed for the purpose of tapping an ovarian cyst, to diminish its size prepara-

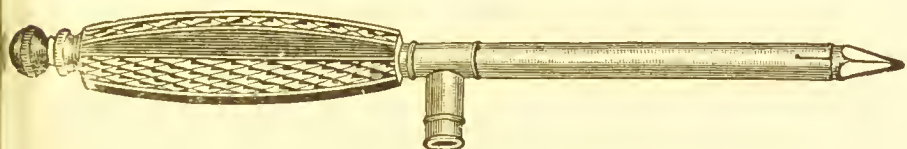


FIG. 24.—Trochar and Canula.

tory to removal. By this means a large cyst can be delivered through a comparatively small wound. To the side tube indicated in the figure a length of tubing is attached, and, after the cyst is tapped and the canula withdrawn, the fluid contents are conveyed to a pail under the operating table.

*Pedicle Needle.*—This is a blunt-pointed needle (Fig. 25), by means of which the pedicle of an



FIG. 25.—Pedicle Needle.

ovarian tumour, or other tissue requiring ligation, is transfixed. The needle is then threaded with the ligature (silk, catgut) and withdrawn.

*Pedicle Forceps.*—This consists of a forceps provided with two narrow blunt-pointed blades (Fig.

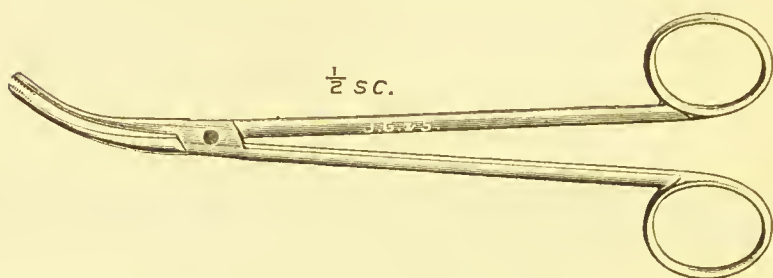


FIG. 26.—Brewis' Pedicle Forceps.

26). The forceps, with the blades closed, is pushed through the pedicle, the ligature is grasped and pulled through.

## CHAPTER III

### MICRO-ORGANISMS—INFLAMMATION—SEPSIS

THE great strides made of recent years in surgery are due, in the main, to two factors—the discovery of *anæsthetics*, and the consequent abolition of pain during an operation, with a great extension of the field of operative work, and the discovery by Lister that the organisms responsible for inflammation and suppuration in wounds may be combated by *anti-septics*.

A knowledge of antiseptic procedure and of its more recent development, aseptic procedure, should be familiar to every student and nurse. Whether it be in general surgery, gynæcology, or obstetrics, the least carelessness or inattention to antiseptic precautions may be fraught with disastrous consequences.

As is well known, the processes of inflammation and suppuration are due to the presence of extremely minute living bodies, called *micro-organisms*, that gain access to the wound during or after an

operation. These organisms vary greatly in kind and activity, and it would be going beyond the scope of this book to describe, except in the briefest manner, the appearances and effects of these minute enemies of the human body.

For purposes of detection and recognition, the tissues in which they are suspected are stained by special dyes, and then subjected to examination with the microscope, and, according to the appearances which they present, the micro-organisms are divided into various classes.

The commonest organisms discovered in wound infection are the ordinary *pyogenic or pus-forming organisms*, of which the staphylococci and the streptococci are the chief. The **Staphylococci** are so called because they consist of cocci, or dot-like organisms, collected together into masses. The less severe and localised forms of inflammation are due to these organisms, *e.g.* the abscesses which form in connection with skin stitches. The **Streptococci** are so called because the dot-like organisms or cocci occur in chains. They are responsible for the more severe and spreading forms of inflammation.

In a number of gynæcological cases the cause of inflammation and suppuration are the **Gonococci**. These organisms, also cocci, are usually found in pairs. The gonococcus is the active organism found in gonorrhœa, and, as will be described in a later chapter, gives rise to severe inflammation of the

external genitals, urethra, vagina, uterus and tubes, and in some cases, as the result of direct extension along the internal genitals, to inflammation of the pelvic peritoneum.

Another organism of note is the **Bacillus Coli Communis**. This is a rod-shaped micro-organism or bacillus, which inhabits almost the entire length of the alimentary canal, and is responsible for a certain number of cases of inflammation in the genital tract, frequently associated with the presence of extremely foul-smelling pus.

Another organism which must find a place in this description is the **Bacillus Tuberculosis**. This is also a rod-shaped organism or bacillus, and is responsible for a special form of chronic inflammation not infrequently encountered in the female genital tract, and associated with the production of soft caseous or cheese-like material. This tuberculous inflammation is occasionally met with on the vulva, and not infrequently in the uterus, tubes, and in the pelvic peritoneum.

For a proper appreciation of the dangers which beset a gynæcological patient who is the victim of organismal infection, whether it be in the abdomen or in the pelvis, a knowledge of the diseased processes, which occur as the sequel of that infection, should be familiar to every student and nurse. In a book such as this only a brief resumé of the pathological changes is possible.



The changes which these organisms effect in the tissues may be exemplified by the processes which are well known by every one to occur during inflammation and suppuration. These changes are brought about, in every case, by the presence of germs. When organisms gain access to a part, *e.g.* a wound, they may give rise to inflammation, with the signs always associated with this process, such as redness and swelling. After a time the effects of the organisms are, as it were, cut short and the inflammation subsides. Or the process may go on to abscess formation; when the abscess ruptures, a gap on the surface is left, indicating that the organisms have the faculty of destroying the tissues in which they lie.

When micro-organisms gain access to the part, they live at the expense of the tissues. But their intrusion is not tolerated without resentment on the part of the body. The tissues, as it were, rise in arms against the invader. The blood-vessels are dilated, and from them a constant and increasing supply of white corpuscles is sent into the tissues to meet the organisms, be they cocci or bacilli. At the same time lymph is poured out from the blood-vessels into the neighbouring tissues. The dilatation of the vessels and this exudation of lymph give rise to the redness and swelling associated with **Inflammation**. The blood-vessels dilate to carry to the part an increased supply of blood, including the white corpuscles which resist the inroad of the



organisms, and the lymph which dilutes the poisons which these organisms will presently be described as producing. This dilatation of the blood-vessels is obviously an attempt on the part of the tissues to neutralise and destroy the baneful effects of the invading germs—in fact, the process of inflammation as a whole is to be considered, in the light of modern knowledge, as a protective phenomenon.

After gaining a foothold the organisms grow and reproduce themselves, deriving their sustenance from the tissues in which they lie. In this process they are aided by poisonous substances, called *Toxines*, which they produce, and which have the power of killing and breaking up the living tissues with which they are in contact, thus reducing them to a condition which permits of their being digested by the organisms.

This process of tissue-destruction is closely allied to the ordinary process of putrefaction, and is called **Sepsis**.

The white blood-corpuscles or *Leucocytes* which, by the dilated blood-vessels, are hurried to the scene of conflict, have the power of devouring any inimical germs that attempt to molest the body. Before reaching the organisms they have, however, to encounter the line of defence which their foes have thrown round them in the shape of the poisonous toxins. If they are capable of braving this, and of

forcing their way to the camp of the organisms, they exercise their phagocytic or devouring powers, and the battle is decided in favour of the tissues. If, on the other hand, the white corpuscles are overwhelmed by the virulence of the toxines, the organisms gain the day, and they are, for the time being, allowed to proceed in their work of destruction. But the white corpuscles are being continually hurried forward to the scene of conflict, and every inch of the ground is hotly contested. The fresh endeavours on the part of the tissues may stem the progress of the organismal invasion; the germs, however, may be so virulent, or the tissues of the body so exhausted, that the work of destruction continues to the last unabated, and the patient must inevitably die.

Besides the local effects of organismal infection, there may be produced general effects on the body. The toxines, or poisonous products of the organisms, may be carried into the circulation, and produce the **Fever** so frequently associated with infection of a wound—with elevation of temperature, rapidity of pulse, and sweating.

In other cases, not only the toxines but the organisms themselves gain access to the general circulation. Carried along in the blood stream, they may settle down in different parts of the body to form multiple abscesses. This condition is termed Pyæmia, and is an extremely grave form of fever.

Any of these conditions may be found in gynæco-

logical practice as the result of organismal infection, and the nurse and student will understand that, to safeguard their patient against the inroad of germs, it behoves them to cultivate with care the principles by means of which these germs are combated.

## CHAPTER IV

### ASEPSIS—ANTISEPSIS—STERILISATION OF HANDS, INSTRUMENTS, AND DRESSINGS, ETC.

IT may be taken for granted that every surface, unless specially treated, is richly sprinkled with germs, and is capable of conveying danger to any wound. Even the dust particles in the air, if scrutinised by the microscope, would be found to be laden with baneful organisms. Such being the case, the nurse and student will easily understand that no material or instrument must be allowed to approach the neighbourhood of a wound until means have been employed to free it from its danger-producing organisms. The surface of the patient to be operated on, whether the skin of the abdomen or mucous membrane of the vagina, the hands of the operator, assistant, and nurses, the instruments, ligatures, and sutures, and the swabs or sponges, must all be subjected to the most rigorous sterilisation before every operation.

It is well here to linger a moment to describe the

terms Asepsis and Antisepsis. **Asepsis** (*a*, "without") indicates the state of freedom from organisms, and is the ideal towards which aseptic and antiseptic surgery are directed. **Antisepsis** (*anti*, "against") is the term given to the processes by means of which organismal infection of a wound is prevented, and by means of which, once it has occurred, it is combated. So that, in reality, asepsis of a wound is the condition arrived at by the medium of antisepsis, although, of course, in a certain proportion of cases the tissues, aided by the leucocytes and lymph, may of themselves kill or wash out organisms that gain access to a wound, and thus play the part of antiseptics.

Antisepsis, then, is the term applied to every process by means of which germ infection is prevented or contended with, whether it be by means of heat, or the use of lotions, powders, etc. In ordinary parlance, however, the term "antiseptics" is confined to those medicaments, carbolic acid, iodoform, etc., which have the power of killing or diminishing the activity of germs.

*Sterilisation* consists in the removal or destruction of the inimical germs on the hands of the operator and nurse, on the instruments and dressings, and on the surface of the patient to be operated on.

The consideration of the preparation of the vagina will be conveniently discussed in the chapter on Preparation for Minor Operations (Chap. XVI.), and of the

preparation of the skin of the abdomen in the chapter on Abdominal Section. There falls to be considered in this chapter the sterilisation of the hands, instruments, and dressings, gowns, towels, etc., used for the operation.

**Sterilisation of the Hands.**—In this connection it is well to remember that measures should be taken by every person engaged in operative work, whether operator, student, or nurse, to keep the hands in as clean and germ-free a condition as possible in the intervals between the operations. The greatest care should be taken to avoid, if possible, the touching of any wound that might infect the hands. Where it is necessary to dress septic wounds rubber gloves should invariably be worn during the dressing, and, immediately after its completion, should be washed thoroughly and sterilised before being again used for another such dressing. Gloves used for septic purposes should be set apart, and never used for operative work.

Where rubber gloves are not obtainable, and it is necessary to dress a septic case, the nurse or student should take the most stringent precautions that none of the septic discharge is allowed to contaminate the hands. This can be done by removing the infected dressings with forceps, and by washing and squeezing the wound with fairly large pieces of wool, and never allowing the fingers to touch the contaminated skin in the neighbourhood of the wound, nor the surface

of the wool soiled with the discharge. If the hands be tainted with septic organisms, it often requires days of thorough cleansing before they can be pronounced free of the particular organism concerned.

If the hands are rough and show a tendency, perhaps, in winter to crack, some bland lanoline cream, rubbed on every evening, is often sufficient to restore the skin to its normal soft and healthy condition.

The nails should be cut short, as the crevices under long nails are a fertile breeding-ground for organisms.

Before every operation the hands must be patiently and vigorously cleansed. All matter must be removed from under the nails by a nail-cleaner. The sleeves are turned up well beyond the elbows, and with a sterilised nail-brush the hands and arms are thoroughly scrubbed for at least five minutes with green turpentine soap and water. The water should be as hot as is just comfortably borne, to promote sweating, which tends to wash the organisms from the deeper parts of the skin. A free lather should be produced, and the water must be changed frequently. The brushes employed are boiled before use, and kept in a solution of 1-20 carbolic.

Thereafter the hands and arms are carefully rubbed with turpentine to remove the surface grease, in which organisms still lurk, and then transferred to corrosive sublimate lotion (1-2000), in which they are rinsed for a minute or two. During the operation the hands are



frequently bathed in a weak solution of corrosive sublimate (1-5000).

It is needless, perhaps, to say that, after the hands and arms have been cleansed, the nurse or student must be scrupulously careful not to touch anything that has not been sterilised, and, if by accident such should occur, the hands should again be washed carefully in corrosive lotion.

If, during an operation, the hands have been accidentally contaminated with septic material, it is well to subject them to the strongly antiseptic influence of a saturated solution of permanganate of potash in water. The hands are soaked in this for a minute or two (not longer, as otherwise the stain is difficult to remove), till a deep mahogany stain is produced, and then transferred to a second basin containing a saturated solution of oxalic acid in water, and thoroughly rubbed with this till the brown stain is removed. This can often be accelerated by the aid of a nail-brush. After this the oxalic acid is, in its turn, washed off with sterile water.

**Rubber Gloves.**—Within recent years the use of gloves to cover the hands during an operation has been strongly advocated and largely practised. The advantages of this practice are twofold—if used for septic cases they protect the hands from the chance of infection, and in ordinary operations they protect the wound from the risk of infection from the hands.



In support of the use of the glove, as a routine, during operations, its advocates very rightly assert that, even after the most careful and rigorous cleansing, the skin of the hands, especially in its deeper layers, can be proved to still retain dangerous organisms. During the operation the continual movement of the fingers and hand, and the sweating induced by the warm lotions, are apt to bring these germs to the surface. When the hands are covered by gloves the possibility of infection of the wound in this way is reduced to a minimum.

The glove most commonly in use is the Rubber Glove, which is obtainable in different thicknesses and of different sizes. An average size for the nurse would, perhaps, be  $6\frac{1}{2}$  or 7, and for the operator, perhaps,  $7\frac{1}{2}$  or 8. For ordinary operative work we recommend the thin brown rubber glove, which can be sterilised conveniently with the dressings.

It should be remembered that the use of the gloves for an operation should not diminish the care and patience exercised in the cleansing of the hands, for, in the first place, the uncovered hand is used in putting on one of the gloves, and, in the second place, the gloves, especially in the case of the surgeon and his assistant, are liable during the operation to be punctured with a needle or other instrument. Immediately this occurs, infection may readily reach the wound from an improperly cleansed hand.

The gloves may be sterilised dry with the dress-

ings, or they may be sterilised by boiling for five minutes in water. In the latter case soda must be avoided, as it exercises a harmful effect on the rubber of the gloves. In the former case, the interior of the gloves should be dusted with powdered talc to facilitate their being put on, and then put in the caskets with the dressings, rolled up in a piece of gauze, and subjected to the influence of steam under pressure. The hands must be thoroughly dried before attempting to put on dry gloves, and powdering them with sterile talc will still further facilitate the process.

**Sterilisation of Instruments.** — The method employed in the sterilisation of instruments depends upon the fact that boiling for five minutes in water is sufficient to kill all the ordinary organisms.

The instruments are immersed in a steriliser in water, to which sodium carbonate or washing-soda has been added in the proportion of about one teaspoonful to the pint of water. The addition of soda to the water prevents rusting of the instruments, and is also said to dissolve the capsules of the germs, and thus facilitate their destruction. In private work the small steriliser represented in the figure (Fig. 27) is all that is required. It can be obtained in different sizes, according to the size of the instruments to be sterilised. The instruments are placed in the perforated tray and put into the steriliser, where they are immersed in the soda solution, which is brought

to the boil and kept boiling for five minutes, by means of a methylated spirit lamp or Bunsen gas flame underneath.

In hospital work the heat required is frequently obtained by directing steam from the hospital main supply into the bottom of the steriliser.

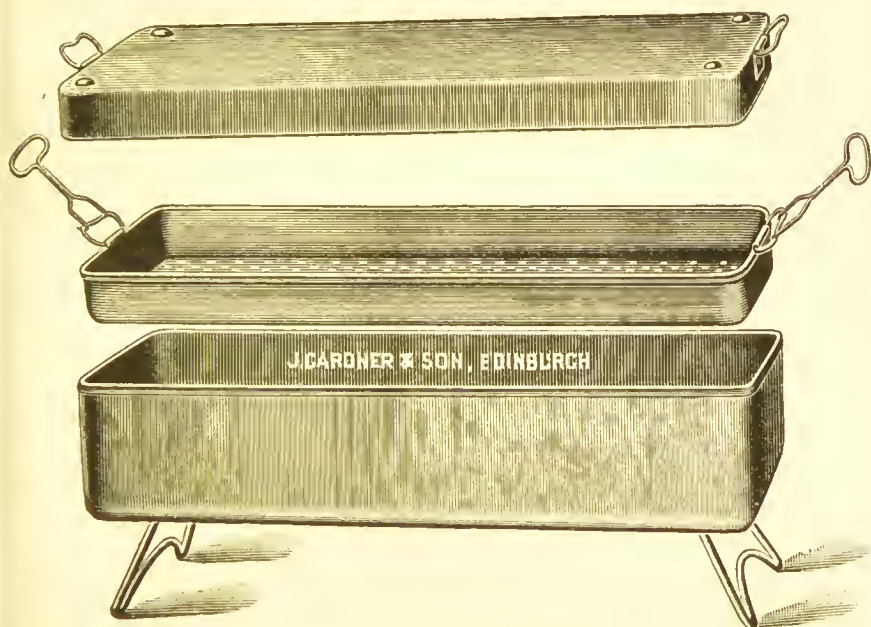


FIG. 27.—Instrument Steriliser.

After boiling for five minutes the gas or lamp is extinguished, or the steam is shut off, the tray is taken out of the steriliser, and the instruments are transferred by sterilised hands to a flat porcelain dish, containing some sterile water or weak carbolic acid solution (1-100).

When *needles* are being sterilised, they should be put in a metal box and boiled with the rest of the instruments. The habit of sticking them into a piece of lint or gauze is to be avoided, as, on their removal, they are frequently found to be rusted at the points of contact with the lint or gauze.

*Knives* may be conveniently sterilised by boiling for half-a-minute in soda solution. To prevent dulling of the cutting edge in the process, care must be taken to ensure that, by the movements of the boiling water, the edge is not rubbed off by coming into contact with any other material. This is readily accomplished by placing the knives in metal stands, or by ensheathing the blades in metal cases. Knives may also be perfectly sterilised by immersion in pure lysol, and an advantage of this method is that the instruments may stand indefinitely in the antiseptic without rusting.

**Care of Instruments after Operation.**—It is convenient at this point to refer to some important facts in connection with the care of instruments after operation. Their recognition will go far to prevent the rusting and wanton destruction of instruments so frequently encountered.

After being used the instruments should be washed with water, soap, and soda, and scrubbed with a brush to remove all blood stains. They are then boiled for a minute or two, after which they are carefully dried.

In the process of cleansing and drying, the forceps, scissors, etc., should, where possible, be disjointed, and the catches, joints, and teeth thoroughly scrubbed with a nail-brush, and then carefully dried. The parts of the instruments difficult of access for purposes of drying can be efficiently and easily dried by passing the instruments backwards and forwards through the flame of a spirit lamp or Bunsen gas. The metal should not be heated more than can be easily borne by the fingers, to avoid reducing the temper of the instrument.

Every instrument, also, is periodically scoured with some silver paste or powder to retain its brightness.

Needles should be carefully cleansed and polished after use, and should all be threaded on a long piece of suture silk and drawn along it several times, to thoroughly clean the eye of each.

Special care should be taken with all tubular instruments—such as canulæ. After being cleansed and boiled, a little ether or absolute alcohol is run through them, and they are then carefully dried by passing a long strip of gauze or lint along the channel of the tube with the aid of a probe or catheter stilette.

The same precautions must be taken with the double-channelled intra-uterine catheter. For purposes of cleansing it should be taken to pieces. A piece of wire or fine stilette is passed along its canal to remove any débris or blood-clot that may lurk in

its many crevices. It is then cleansed and boiled, and thereafter a little ether or absolute alcohol is run through it to render it thoroughly dry, and thereby prevent the possibility of rust forming in its channel.

The irrigator or douche-can also, with its tubing and nozzle, should always be carefully cleaned after use.

**Sterilisation of Dressings, etc.**—For the sterilisation of dressings, operating gowns, towels, etc., either hot air or steam may be employed.

In recent years the use of steam has almost entirely replaced hot air as a means of sterilisation, both in private work and in hospitals.

Under the ordinary conditions of atmospheric pressure water boils at a temperature of about  $212^{\circ}$  F., and the steam generated in the process is at the same temperature. Materials may be conveniently sterilised by being subjected to steam at this temperature for thirty minutes or so.

Where possible, however, in private and hospital work, sterilisation by **steam under pressure** is employed. This process depends upon the fact that, if steam be generated under a pressure greater than the ordinary atmospheric pressure, its temperature is greater, and the germicidal influence of the steam is proportionately enhanced.

At an increased pressure of 15 lbs. to the square



inch steam is at the temperature of about 250° F. By subjecting the materials to such for thirty minutes, perfect sterilisation is procured; the organismal

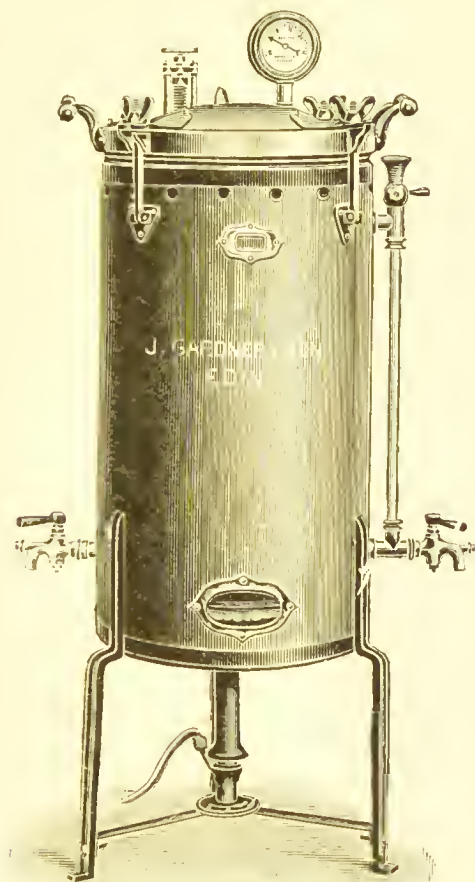


FIG. 28.—Dressing Steriliser.

spores which resist the action of ordinary steam succumb to this higher temperature.

Fig. 28 shows a steriliser in which materials are

subjected to steam under pressure. It consists of two cylinders, the one within the other. The inner cylinder forms the sterilising chamber, the space between the two cylinders contains the water to be boiled for the purpose of generating the steam. Into

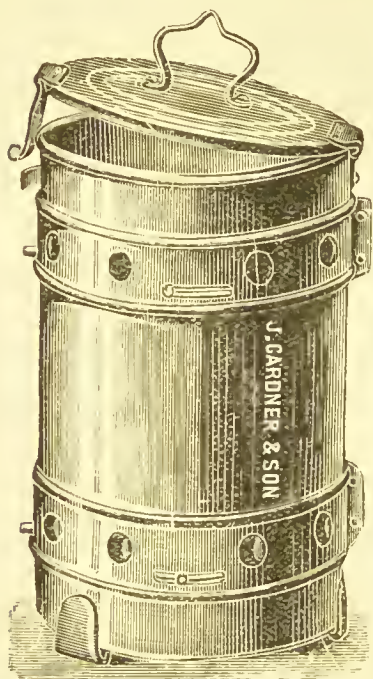


FIG. 29.—Casket for Dressings.

this intervening space a quantity of water is poured by means of the funnel and upright glass tube represented on the right of the steriliser. The elevation to which the water rises in the steriliser is indicated by the height of the water in the glass tube—it should be poured in till it mounts about a third of the way.

The dressings, towels, operating gowns, gloves, iodoform gauze, and other materials, are put into suitable containers, of which, perhaps, the metal casket represented in the figure (Fig. 29) is the most convenient, and the top of the steriliser is firmly screwed down. The water is now brought to the boil by means of the Bunsen flame underneath the steriliser. The steam, generated in the boiling chamber, passes up and escapes into the



sterilising chamber by small holes near the top of the inner cylinder. The tap, indicated on the left of the figure, is left open till the steam freely escapes. By this means all the contained air is dispelled. This tap is now closed, and the pressure rapidly rises in the steriliser, as indicated by the pressure-gauge fitted on to the lid, until it reaches 15 lbs., at which pressure the materials are sterilised for thirty minutes. If the pressure at any moment exceeds 15 lbs., the safety-valve, shown to the left of the pressure-gauge, allows the steam to escape and the pressure is re-adjusted. The possibility of explosion is thus eliminated.

After thirty minutes' sterilisation the flame is extinguished. The steam is allowed to escape, the lid is opened, and the caskets are removed.

In hospital work the steam employed is frequently passed into the steriliser directly by means of a connection with the main hospital supply.

The steriliser used for **steam at the ordinary pressure** is similar to that represented in the figure, except that the steam, instead of being retained in the steriliser, is allowed to escape as it is generated by a side tube leading to the bottom of the inner cylinder. The position of attachment of this side tube would correspond to the tap shown on the left of the figure. After traversing the inner chamber, and sterilising the dressings, etc., it passes by this tube to a basin of cold water in which the tube is immersed. Here the

steam is condensed. The same directions apply to this apparatus, with the addition that, before removing the lid at the end of the sterilisation, the side tube should be removed from the condensing basin to avoid the danger of the water rushing back into the steriliser.

As already mentioned, the materials to be sterilised are placed in specially constructed containers. A convenient form is the *casket or kettle*, represented in Fig. 29. These, as usually made, consist of plated brass, and are supplied in different sizes. Before being put into the steriliser the perforations, represented in the sides of the apparatus, are opened by means of the slides. The steam is thus allowed free access to the contents. After being removed from the steriliser, the slides are closed and the sterilised contents can be kept till required, secure from the danger of organismal infection.

**Sterilisation of Water.**—In hospital work and in nursing homes, where it is desired to sterilise water in quantity, the form of steriliser represented in Fig. 30 is found useful. It consists of a metal cylinder of suitable size to contain the water, which is boiled by means of the Bunsen flame, indicated in the figure. The level of the water in the cylinder may be noted at any time by a glance at the upright glass water-gauge, represented on the left (W). To reduce the temperature to a level suitable for use, a stream of

cold water is allowed to circulate through the spiral coil (C); it enters by the tube G, and escapes, after

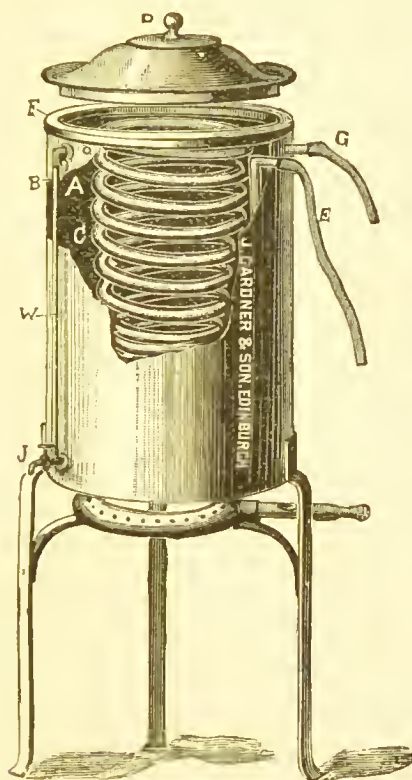


FIG. 30.—Water Steriliser.

traversing the coil, by tube E. When required, the water can be run off from the tap J.

**Preparation and Sterilisation of Ligatures and Sutures.**—The methods adopted in the preparation of catgut, silk, etc., for operative work will be described in Chap. XXVI.

## CHAPTER V

### THE EXAMINATION OF PATIENTS

IN Gynæcology the nurse and student have to deal with cases in which disease has affected the external and internal female organs of generation.

As has, however, been shown in Chapter I., the rectum and anus, and the bladder and urethra, are closely connected anatomically with the organs of generation. It can, therefore, be easily understood that the gynæcologist frequently finds that, besides directing his attention to the organs of generation, he is called upon to treat conditions of the above-named organs.

When a patient presents herself, complaining of symptoms which point to disease of the pelvic organs, or to affections of the external genitals, the gynæcologist generally finds it necessary to examine her. Before this can be done, she must be prepared in such a manner as to enable the gynæcologist to make a satisfactory and reliable examination, and at the same time minimise the discomfort to the patient.

Should a patient at the time of examination have the bladder distended and the rectum loaded, the vaginal canal into which the gynæcologist's fingers are inserted for the purpose of detecting disease in the pelvic cavity has its calibre much encroached upon, and, accordingly, the examination is rendered more difficult to the gynæcologist and more painful to the patient than would be the case if the bowel and bladder were previously emptied. Moreover, as will be referred to further on, a full bladder or a loaded intestine may sometimes produce a swelling in the abdomen, and may therefore often be a source of uncertainty and, in some cases, of actual fallacy in diagnosis.

An examination may be conducted by sight, by touch, or in some cases by both. In the process, instruments are often used, in which case special preparation of the patient is necessary.

Before giving in detail the various methods of examination, a knowledge of which will give an intelligent idea of the preparations necessary for each, it is only right to mention certain well-known facts, which modify the method of examination, or render it undesirable. In this respect the age of the patient is an important point. Vaginal examination of a *young girl or unmarried woman* is apt to cause rupture of the hymen, with pain and bleeding. In such cases, if examination be necessary, the gynæcologist frequently resorts to examination "per

rectum." Medicinal measures should also be tried. If these be insufficient, and a vaginal examination be necessary, it is desirable to carry it out under an anæsthetic.

A simple abdominal examination, including inspection, palpation, percussion, and auscultation, may be made on any patient.

Married women may be examined by any of the methods mentioned below without the use of an anæsthetic, which is necessary only when the patient's nervousness or sensitiveness makes the process difficult and unsatisfactory. Rigidity of the abdominal wall, for example, greatly interferes with the bimanual examination, and, in some cases, this difficulty can be overcome only by the anæsthetising of the patient.

The question of vaginal discharge is also of importance. The presence of leucorrhœal (white), hæmorrhagic or purulent discharge, does not prevent vaginal examination, provided that proper precautions be taken.

In all cases, however, except where the symptoms are extremely urgent, **menstruation must postpone examination**, no matter how simple that examination may be.

With regard to this, it is well to know that menstruation may begin quite unexpectedly an hour or two before the time appointed for the examination. A nurse who has had even a small

gynæcological experience will have noticed this premature menstruation occasionally occur on the morning of the day for which the operation had been fixed. This is doubtless the result of excessive anxiety and fear. Let every nurse, therefore, inquire into this matter, and make sure that, when her patient is placed on the examination or the operating table, no sign of menstruation is evident.

#### METHODS OF GYNÆCOLOGICAL EXAMINATION

The various methods of examination that may be employed in gynæcological practice are:—

Abdominal Examination.

Examination of External Genitals by Sight  
(Inspection).

Vaginal Examination (per Vaginam).

Bimanual Examination (Abdomino-Vaginal).

Rectal Examination (per Rectum).

Rectal Bimanual Examination (Abdomino-Rectal).

Recto-Vaginal Bimanual Examination (Abdomino-Recto-Vaginal).

Any of these methods may be employed with or without the use of an anæsthetic.

Besides these methods of examination, we must mention in passing the **Examination of the Breasts**, which may give useful information, especially in some cases of abdominal swelling, where the diag-



nosis is uncertain. The presence of large, turgid mammæ from which fluid can be expressed is, especially in the woman who has never borne a child, strong presumptive evidence in favour of pregnancy.

**Abdominal Examination.**—This is made under the headings of inspection, palpation, percussion, and auscultation.

*Inspection.*—The condition of the abdominal wall is first noted; whether it is well nourished, or emaciated, as in wasting diseases. The condition of the umbilicus is noted; whether it is retracted, as is the usual state, or whether it is flush with or projecting beyond the surface of the abdominal wall. The absence or presence of the dark line of pigmentation, extending from the umbilicus to the pubis (*linea nigra*), is noted; this is especially well seen during pregnancy. *Striæ gravidarum* may be seen on the lower abdominal wall. These are produced after any well-marked distension of the abdomen from whatever cause, and consist of more or less transverse scar-like areas slightly depressed, and, in the recent state, of a bluish colour; when of longer duration, they become whitened.

The presence, form, and position of any abnormal swelling is seen. And, lastly, the movements of the abdominal walls are noted as to whether they are free, or, as in inflammatory conditions of the peritoneum, restricted.



*Palpation.*—By means of the palpating hand the presence of any undue resistance or tenderness is felt, and the limits and characters of any tumour are recognised. If the swelling be fluid, and not under too great tension, a tap with the finger will send a fluid wave throughout the tumour, which is recognised as a thrill by the other hand. If the fluid be distributed over the abdomen it will gravitate to the flanks, and a tap on one flank may be recognised as a fluid wave in the other flank, the hand of the nurse or other person being placed along the midline of the abdomen to intercept the wave that might be transmitted by the abdominal wall.

*Percussion.*—By this means the existence of dullness, due to fæcal masses, inflammatory, tumour, or fluid swelling, is revealed, or undue resonance due to excessive gaseous distension of the bowels. Where there is an encysted collection of fluid the dullness does not change with change of position, but where the fluid is free in the abdomen (ascites), the flank, which is dull in the dorsal position, becomes resonant when the patient is turned over on to the side by the fluid gravitating to the opposite side.

*Auscultation.*—With the stethoscope the presence of the sounds of the child's heart will prove an abdominal swelling to be due to pregnancy. Or the soft, blowing sound, produced by the blood rushing through the blood-vessels of the uterus in cases of

pregnancy, or in some cases of fibroid tumour of the uterus, may be heard (uterine souffle).

**Inspection of External Genitals.** — Out of consideration for the feelings of the patient this mode of examination should be avoided as a routine. It will, however, be necessary where there is pain or irritation referred to the region of the external genitals, and where the patient complains of "something coming down." In making the examination the greatest care must be taken to avoid exposing the patient unnecessarily.

Inspection may reveal the presence of acute inflammation of the hymen and vestibule, with a copious discharge of thick yellow pus. This will strongly suggest the possibility of Gonorrhœa, especially if at the same time the urethral orifice is inflamed, and is seen to exude a drop of pus, and if the orifices of the Bartholinian glands, which lie immediately to the outer aspect of the hymen, about two-thirds of the way along the inner aspect of the labia minora, are also inflamed and discharging pus. Where there is no actual discharge of pus from the urethra in a case of gonorrhœa, a drop may be coaxed from the urethral orifice by insinuating the finger into the vagina, and gently stroking the urethra from behind forwards. Where the parts are touched in such infective cases it is advisable to protect the hands with gloves.

The suspected presence of Syphilis also indicates inspection, and the presence of the skin and mucous manifestations of that disease may be detected.

If the patient volunteers a history of pain on micturition, an examination of the parts may divulge the presence of a small, deep-red, painful swelling on the posterior edge of the urethral orifice—Urethral Caruncle.

So also, if the patient complains of a bearing-down feeling and of something coming down, an examination may detect the presence of a tear of the perineum, with, perhaps, a protrusion of the anterior vaginal wall, containing the bladder (cystocele). In other cases, also, the cervix uteri and even the womb itself, covered by the vaginal walls, may protrude from the vulvar orifice (prolapse of the uterus).

The irritation or pain referred to the vulva may also be due to abscess of the labium majus, ulcers, or tumour growths (cancer, etc.).

In inflammatory conditions in this neighbourhood the patient may complain, also, of pain in the groin, and on examination of that region the glands are found to be enlarged and tender.

**Vaginal Examination.**—The vaginal examination consists in an investigation by means of touch into the condition of the vaginal orifice and walls, and the vaginal portion of the cervix. As already mentioned,

in the case of young girls it is necessary, and in the case of unmarried women advisable, to administer a general anæsthetic before making the examination, which entails considerable nervous upset, and in many cases rupture of the hymen with pain. As mentioned before, also, menstruation will in most cases postpone examination.

In the vaginal examination the examiner uses the index and middle fingers of the right hand, except in unmarried women, when the index finger alone should be used to avoid excessive stretching of the hymen.

The position which disturbs the patient least is the left lateral posture ; but, where the vaginal examination is to be succeeded by the bimanual, the dorsal posture may be assumed from the beginning. These two positions will be described in the course of a few pages.

The hands must be cleansed and dried with a sterilised towel. Thereafter, the examining fingers are lubricated with sterile vaseline or with soap, which, because of the process of manufacture, is sterile. The lubricant is applied with the hand to be employed, for the other hand is required to separate the clothes, and, perhaps, for the subsequent bimanual examination.

The anterior region of the external genitals (clitoris) is very sensitive, and, in introducing the fingers, the greatest care must be taken to avoid

touching it. With experience the examiner acquires the faculty of entering the vaginal orifice directly with ease. For the inexperienced the following directions will prove useful. In the first place, the student is very apt to make the mistake of thinking that the vaginal orifice is further forwards than it in reality is, probably from the fact that he is accustomed to see the patient, for purposes of operation, in the lithotomy position, when the external genitals look almost directly forwards.

The fingers should be carried gently forwards over the perineum until the vaginal orifice is reached. If necessary, the anus may be located with the tip of the little finger, and then the examining fingers traverse the perineum to the orifice. The practice of carrying the examining fingers over the anus, and thence across the perineum to the vaginal orifice, is to be deprecated, for by this means pyogenic organisms, *e.g.* bacillus coli communis, may easily be carried by the fingers into the vagina, and, in certain conditions, may set up troublesome inflammation.

The examining fingers are passed through the vaginal orifice, the thumb being abducted, and the third and fourth fingers flexed on the palm, and thus kept out of the way. The state of the **vaginal orifice** is examined. Does it admit one or two fingers, or even more? Is there any local tenderness? If the orifice is patent, is the perineum deficient?

The fingers are now gently pushed upwards and backwards, and the **vaginal cavity and walls** are explored. Is the cavity empty, or is there any tumour growth, or even foreign body? Are the walls unnaturally warm, indicating inflammation? Are they smooth, or roughened by mucous folds (*rugæ*)? Are the walls taut, as in the childless woman, or are they lax, as in the woman who has had many children?

The **vaginal portion of the cervix** is examined next. Under normal circumstances it should be readily felt by the examining fingers. If abnormal in *elevation*, is it lower down than it should be, as in prolapse of the uterus? Or is it only felt with difficulty, lying higher up than normally in the pelvic cavity? In such cases, by pressing the hand firmly against the perineum, the pelvic floor is forced upwards and the fingers will be enabled to reach appreciably higher. Is the cervix lying in the normal *direction*, namely downwards and backwards, or is it directed downwards, or downwards and forwards, as happens when the whole uterus is tilted backwards (*retroversion*)? The *size and shape* of the cervix should be investigated. In a woman who has had no children (*nullipara*) the cervix is conical, and in a woman who has had children (*multipara*) the cervix usually loses its conical shape and becomes more cylindrical, or, if conical, has more the shape of a truncated cone. The *os uteri* should next be investigated. Is it



small and round (nulliparous), or is it larger and transverse, as in a woman who has had children?

After investigating the vagina itself—including the walls, cavity, and cervix—attention is now directed to the condition of the pelvic structures, which may be felt through the vaginal walls. For this purpose the **Fornices** are examined. The fingers are passed into the *Posterior Fornix*. The normal posterior fornix has a rounded, dome-like surface, concave downwards when stretched by the examining fingers, and is soft and yielding. The fingers are pressed upwards, and under normal circumstances should encounter nothing beyond the vaginal wall. In this position the fingers are pressing into the Pouch of Douglas, which is separated from the examining fingers only by the thin vaginal wall and the layer of peritoneum covering it.

Under abnormal circumstances the soft, yielding sensation may be lost, and the fornix may be encroached upon by resistant inflammatory material in the Pouch of Douglas, or in the ligaments which pass backwards from the upper part of the cervix to the sacrum (utero-sacral ligaments). Or the Pouch of Douglas may be filled with blood clot. The examining fingers also may feel the firm and rounded body of the displaced uterus, or it may be a hard fibroid tumour growing from the back of the body of the uterus. In some cases it may be a normal or enlarged ovary displaced downwards into

the Pouch of Douglas (prolapse of the ovary), or, in still other cases, it may be a Fallopian tube enlarged, as in tubal pregnancy, or inflamed and distended with pus (pyosalpinx). In some cases, if the bowels have been improperly emptied, fæcal matter may be felt in the rectum.

After exploring the posterior fornix the fingers are carried forwards in front of the cervix, and the *Anterior Fornix* is examined. If, in the normal condition, the fingers are pressed upwards in this position, the firm, rounded body of the uterus should be felt. If this is displaced backwards, the fornix is found to be empty. By carrying the fingers to the sides of the cervix, the *Lateral Fornices* are explored. Normally, nothing will probably be felt. Under abnormal conditions an enlarged tube or ovary, or inflammatory material in the broad ligaments, may be palpated. In other cases a fibroid tumour may be felt growing from the side of the uterus.

**Bimanual Examination.**—This is the most important method of examination employed in gynaecological practice, and a proper understanding of its technique is a *sine qua non* for accuracy in diagnosis. It consists in a palpation of the pelvic organs between one hand (usually the left) placed on the lower abdomen and the fingers of the other hand inserted into the vagina.



In this way, to the practised hand, the position, size, shape, and mobility of the uterus, and the condition of the Fallopian tubes and ovaries, can be ascertained, and the position, shape, and consistence of any abnormal swelling in the pelvic cavity can be determined.

In making this examination the patient should be lying in the dorsal posture. The legs are drawn up, and the patient is requested to breathe easily and freely, relaxation of the abdominal muscles being thus ensured.

The fingers, which have just completed the vaginal examination, are now supplemented by the abdominal hand, which is placed on the abdominal wall, in the middle line, just above the pubis. The cervix is steadied by the fingers in the vagina, and the abdominal hand is gradually and steadily depressed in the direction of the pelvic cavity. As this is done the rounded, pear-shaped uterine body is felt between the two hands, lying forwards just behind the pubic symphysis. The palpation of the uterus may be aided by lifting up the cervix from the vagina. By this means the uterus is, as it were, brought into the "ken" of the abdominal hand (Fig. 31). The fingers in the vagina, as already mentioned are enabled to reach higher in the pelvic cavity by pressing firmly against the perineum, and thus dimpling in the pelvic floor.

The hands are now carried to one side and then

to the other, and the tubes and ovaries are palpated. This can be most easily done by pressing the abdominal hand firmly downwards at the side of the uterus, close to the pelvic wall, and at the same time carrying the fingers in the vagina forwards across the

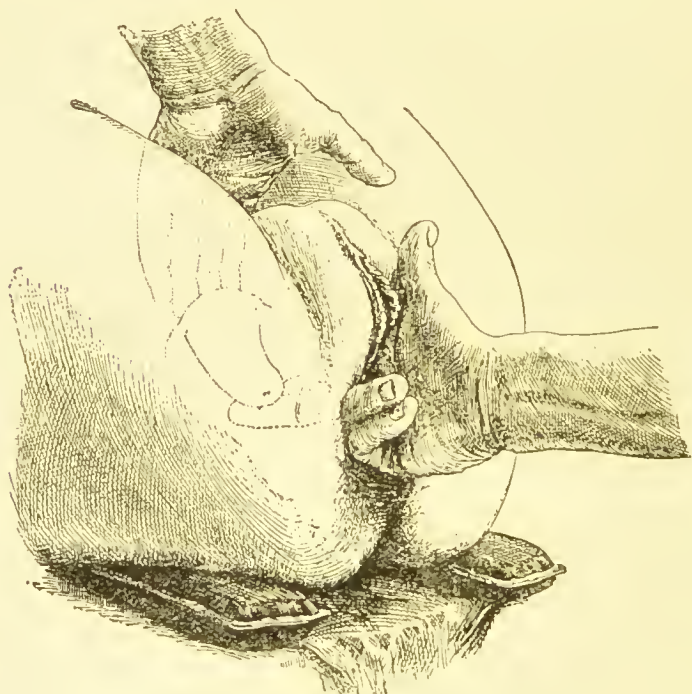


FIG. 31.—Bimanual Examination. (After Kelly.)

lateral fornix, pressing continually upwards meanwhile. By this means the tubes and ovaries are palpated, and the presence of any enlargement detected.

By the bimanual examination, also, the characters of any abnormal swelling in the pelvis, *e.g.* ovarian

cyst, fibroid tumour of the uterus, etc., can be accurately ascertained.

**Rectal Examination.**—This mode of examination must be mentioned here, though a future chapter will be devoted to its discussion. As already mentioned, it is a convenient method of obtaining a knowledge of the state of the pelvic organs in young girls and unmarried women. The rectal examination, also, is frequently necessary where the symptoms point to disease of the lower bowel.

**Rectal Bimanual, or Abdomino-Rectal Examination.**—This is of the same nature as the ordinary bimanual examination, except that the finger introduced into the rectum is substituted for the fingers in the vagina.

**Recto-Vaginal Bimanual, or Abdomino-Recto-Vaginal Examination.**—This is a valuable method of pelvic examination, in which the index finger of the right hand is introduced into the vagina, and the middle finger into the rectum. The bimanual examination is now made with the abdominal hand placed as before.

#### PREPARATION FOR EXAMINATION

The parts to which attention must be directed are the rectum, the bladder, and, in special cases, the external genitals and vagina.

**Rectum.**—Many women pay no attention to the proper regulation of the bowels, and, even in the case of those patients who assert that the bowels move regularly, the rectum is frequently found to be overloaded. Not only so, but the patient may complain of diarrhœa even when the bowel is loaded. This is especially apt to occur when the fæcal matter in the rectum has become transformed into dry, hard scybalous masses, which produce continual irritation of the bowel.

An overloaded bowel makes the vaginal examination difficult for the gynæcologist and painful to the patient. Fæcal masses felt in the bowel through the vaginal wall may be indistinguishable from certain diseased conditions, and, therefore, to enable the gynæcologist to make a correct diagnosis, the bowel should be thoroughly emptied beforehand. A simple enema is scarcely sufficient, and it is better that a nurse should give in every case a purgative the night before, and follow it by a large soap and water enema on the morning of the day fixed for the examination.

To this routine an exception may be quoted. When a woman threatens to abort—as is shown by a discharge of blood from the vagina during pregnancy, and by the presence of pain in the small of the back or the abdomen—it is very desirable to prevent any straining on the part of the patient if abortion is to be prevented. In such a case a nurse will be wise, after having satisfied

herself as to the nature of the case, to leave the patient's bowels at rest till she has seen the gynæcologist, and received definite instructions from him.

**Bladder.**—The condition of the bladder must also be carefully attended to. When distended it is a source of pain during the bimanual examination, and, moreover, may simulate an abdominal tumour. When empty it occupies less space in the pelvis, and, therefore, permits of an easier detection of diseased conditions. Accordingly, just before the examination takes place, care must be taken to ensure that the bladder has been emptied.

Additional preparation is required in three sets of cases :—

When there is excessive vaginal discharge, bloody or purulent.

When instruments are to be used.

When an anæsthetic is to be administered.

When blood issues from the vagina it indicates that a raw surface is present at some part of the genital tract. This is usually in the cervix or in the body of the uterus, and such discharge may indicate tumour growth there, or may be an indication of abortion. As raw bleeding surfaces are readily infected by sepsis, it is advisable in these cases to give a hot antiseptic douche (see Chapter VI.), which will cleanse the vagina, washing away

all clots and *débris*, and by its heat help in checking further hæmorrhage.

In the case of abortion, the gynæcologist is often desirous of seeing any clots, etc., that may have been

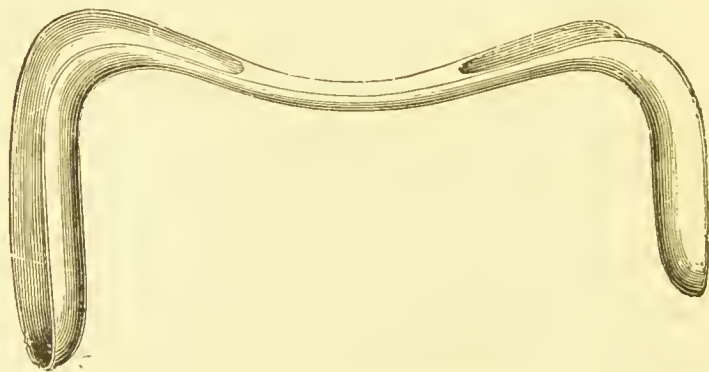


FIG. 32.—Sims' Speculum.

washed out of the vagina by the douche. It is therefore essential that the lotion should not be thrown away, but kept for examination.



FIG. 33.—Volsellum.

In cases of purulent vaginal discharge, *e.g.* acute gonorrhœa, the nurse may douche the patient as above, *but only with permission from the gynæcologist*,



as it often happens that some of this discharge is required for microscopical examination, and if the nurse is not aware of this, she may cause annoyance by having washed away in the douche the discharge which he may have wished to examine.

The instruments commonly used for a simple examination are the vaginal speculum (Fig. 32), by means of which the gynæcologist pulls back the posterior vaginal wall to obtain a view of the vaginal cavity; the volsellum (Fig. 33), by means of which he may draw down the cervix for examination purposes, and the uterine sound (Fig. 34), by which he explores the interior of the uterus and is enabled to determine its size and position.

When instruments are to be used, an antiseptic vaginal douche must, if possible, be given beforehand to prevent the possibility of the instruments becoming contaminated and perhaps carrying infection to the uterus. The instruments are sterilised by boiling, and are then transferred by means of carefully cleansed hands to a



FIG. 34.  
Uterine Sound.



tray with sterile water or a weak solution of carbolic (1-100), or laid on a dry sterile towel.

In handing the volsellum and sound to the gynæcologist the nurse or student should hold these instruments just above the handle. The speculum is warmed and lubricated on the convex surface of the blade with weak carbolic vaseline. The concave surface which reflects the light into the vagina, should upon no account be lubricated (see Chapter II.).

Cases in which much vaginal discharge is present, and all cases in which an anæsthetic is necessary, should, if at all possible, be examined in bed.

Careful attention must be given to the following points when the gynæcologist is to see the patient in her own home :—

The patient should be in bed, and whether suffering from an abdominal tumour or not, the nurse should take it for granted that a vaginal examination will be necessary. To avoid chilling in the course of a prolonged examination, the room should be warm.

As the gynæcologist, before and after examining a patient "per vaginam," will desire to cleanse his hands, the nurse should have ready, in addition to soap and warm water, a small bottle of pure lysol, a good nail-brush which has been boiled or allowed to lie in lysol (1-100) over night, and a small pot of weak carbolic vaseline (1-80).

In cases of cancer of the cervix, etc., where bleeding after examination is frequent and often profuse, and in all cases where the volsellum and sound are to be used, some iodoform gauze and a small packet of sublimated wool should be at hand. A very reliable dressing, from an antiseptic point of view, is Linton's moist iodoform gauze, which can be procured in bottles containing 5 yards.

The gauze is used for plugging the vagina in order to arrest further hæmorrhage, and should be removed within twenty-four hours.

The wool may be used as a pad during the examination or as sponges, in which case small pieces are soaked in a basin of warm antiseptic lotion.

In cases with septic discharge, for example in cancer of cervix, gonorrhœa, etc., the surgeon to protect his fingers may have recourse to rubber gloves. The use of rubber gloves in gynæcological manipulations has been referred to in Chapter IV.

After the examination, the surgeon may wish to apply an antiseptic to any part of the genital tract. In addition to the foregoing requisites he may require uterine forceps (see Fig. 19, page 27), gauze sponges and spongeholders, and the desired antiseptic.

If the patient is to be anæsthetised, special attention must be given to her food (see preparation of patient for minor operations, Chapter XVI.), so as to

minimise the risk of sickness occurring during or after the administration of the anæsthetic.

When an anæsthetic is necessary, the nurse or doctor should have a hypodermic syringe, which is in good working order, charged with ether in case it should be required in the treatment of collapse.

During the examination or after it has been completed, sickness may be present, and therefore a soft towel to wipe the mouth and a small basin or soap-dish should be at hand.

In cases of abdominal tumour where the patient has difficulty in passing urine, it is well to have a catheter ready for use (see use of catheter, Chapter X.), as the gynæcologist may wish to ensure that what appears to be a tumour is not an over-distended bladder.

When it is desired to make an ordinary examination, the patient is usually requested to assume either the Dorsal or the Left Lateral position.

**Gynæcological Positions.**—The Dorsal Position is assumed to allow of simple abdominal examination, for the bimanual and occasionally for inspection of the external genitals.

For *examination of the abdomen* in this position the patient is prepared in the following way:—

The nightdress having been rolled up all round, the bedclothes with the exception of the sheet are turned down to the foot of the bed so as to be well

out of the gynæcologist's way. The sheet is now turned down as far as the pubes, to expose the whole surface of the abdomen. This should be done very carefully in order to avoid unnecessary exposure.

The shoulders of the patient should be but slightly raised by means of a pillow placed under them a little above the level of the shoulder blades. This done, she is instructed to draw up both legs by bending the knees.

The raising of the shoulders and the drawing up of the legs are necessary for the relaxation of the muscles of the abdominal wall, which, when tense, form a great obstacle to this mode of examination.

Should an anæsthetic be used, the shoulders must, however, not be raised; the patient being in a state of unconsciousness, the muscles relax without any mechanical aid.

For the *bimanual* examination the blankets are removed as before; the covering sheet, however, is left over the patient, who is now asked to draw up both legs. The shoulders should be supported as described above, unless the patient is anæsthetised. All manipulation required in the bimanual examination may be satisfactorily conducted under cover of the sheet without exposing even the abdominal wall.

If the *external genitals are to be inspected* whilst the patient lies in the Dorsal position, the vulva should be covered with a small, folded towel, and the lower end of the sheet gathered up in the centre,

allowing the ends to hang loosely over the legs and thighs. When the gynæcologist is ready to examine the patient, the towel is raised or removed, leaving the vulva *only* exposed (see Plate I.). For the purpose of clearer demonstration, the exposure in the plate is rather more than is necessary. An axiom, which every gynæcological nurse and student should continually have before their mind, is the avoidance of unnecessary exposure of the patient.

To assume the **Left Lateral Position** the patient is asked to lie on her left side, with her back to the gynæcologist. She is requested to come right over to the edge of the bed and draw up both legs. In this position the gynæcologist may make a bimanual examination, and it is said that the examining fingers can thereby reach to a higher level in the pelvis. In such cases it is unnecessary to expose the patient. Sometimes, however, if an inspection be desired, the nurse will tuck the side of the sheet under the patient's knees in front, and at the back gather up the sheet in the centre to expose the vulva, which, until the gynæcologist is ready to make the examination, should be covered with a small towel, as described in the Dorsal position.

The **Sims' or Semi-Prone Posture** is of great value in many cases. Like the left lateral position, it necessitates but little exposure of the patient, and is frequently employed for inspection of the vulva and perineum.



Patient, in Dorsal Posture, prepared for Inspection of External Genitals—  
showing how sheet is drawn up in the centre, and parts, until the  
examination is made, are covered by towel.





The patient is brought close to the edge of the bed, couch, or table, as the case may be. Her left arm is drawn from beneath her and allowed to hang over the edge of the bed. She is then asked to draw up both legs, the right leg more than the left. When the position is properly assumed, the patient lies half on the side and half on the face,

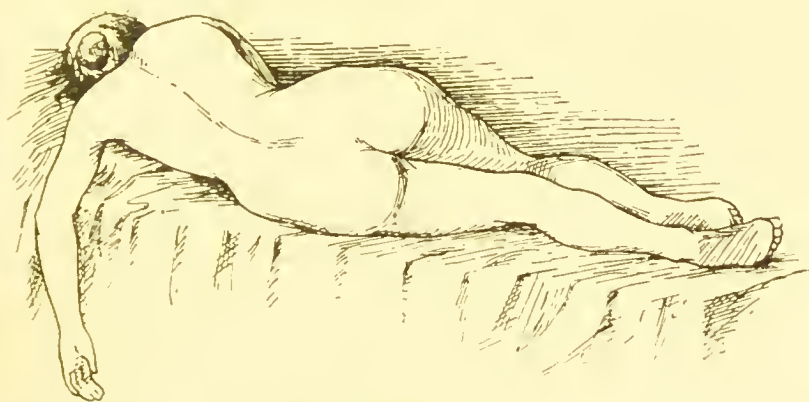


FIG. 35.—Sims' Posture.

and the left side of the head and face, the left breast, and the inner side of the right knee should be in contact with the bed or table (see Fig. 35).

The advantages of this position for purposes of examination depend upon the fact that the abdominal contents tend to gravitate away from the pelvis and produce a certain amount of suction action in the vagina. If the walls of the vaginal orifice be now separated, there is an immediate rush of air into the vagina. The vaginal cavity becomes ballooned,

and a thorough view of the vaginal walls and vault, together with the cervix, is afforded.

The **Lithotomy Posture** is an invaluable position for purposes of gynæcological manipulations. The fact, however, that it necessitates free exposure of the patient prohibits its use for ordinary examination, such as the bimanual, or inspection of the external genitals, unless the patient be under the influence of an anæsthetic.

Its chief value is found in the various gynæcological operations on the vaginal cavity and outlet, *e.g.*, operation for tear of the perineum, and in the cases where it is desired to pull down the uterus for purposes of scraping its interior (curettage), or for its removal (vaginal hysterectomy).

In this position the buttocks project slightly over the edges of the bed or table, and the thighs are separated and flexed on the abdomen, being held in this position by two assistants or by means of a Clover's crutch or vertical leg supports (see Fig. 63, page 177).

For purposes of special manipulation it is sometimes necessary to adopt the **Elevated or Exaggerated Lithotomy Posture**. Here, after placing the patient in the lithotomy position, the pelvis is elevated by lowering the head of the table. If a movable table be not at hand, the same end is attained by placing one or two firm pillows under the pelvis.

The **Knee-chest or Genu-pectoral Posture** is a position of great value, especially for inspection of the interior of the female bladder by Kelly's method (see p. 123). As the name implies, the patient rests on the knees and chest. The thighs are vertical, and the patient is as close to the end of the table as is consistent with comfort. To permit of the chest being properly depressed, care must be taken that the arms are drawn out free from the body.

The **Trendelenburg Posture** is utilised in abdominal operations on either sex, where the surgeon desires to obtain a free exposure of the pelvic cavity. The patient rests on the back as for an ordinary abdominal operation. The table is so constructed that the head of the patient can be lowered, the shoulders being supported by special curved "rests" to prevent the patient from slipping. The angle of inclination of the table can be varied to suit the exigencies of the case (see Fig. 86, page 235).

The lower limbs are maintained in the same line as the trunk. If allowed to hang over the end of the table, undesirable traction is made on the abdominal muscles, and complete relaxation is thus prevented. The efficacy of this method depends upon the fact that, after the abdominal cavity is entered, the intestinal coils gravitate towards the diaphragm and permit of an uninterrupted view of the pelvic contents.

## CHAPTER VI

### THE VAGINAL DOUCHE

THE vaginal douche is usually prescribed for **cleansing** purposes, for the relief of **inflammation** in the pelvis, or for the arrest of **hæmorrhage**.



FIG. 36.—Douche-can, Tubing, and Nozzle.

To administer it properly, the nurse requires the following:—A douche-can with a tap, and large enough to hold at least 2 quarts of water;  $2\frac{1}{2}$  yards of rubber tubing, with a glass vaginal nozzle attached (see Fig. 36); a bath thermometer; a douche pan or bidet, preferably with inflated rubber cushion (see Fig.

37); a pail; plenty of hot water, with the prescribed lotion and a little carbolic vaseline.

The nozzle of the douche should be perforated round the bulb and *never* at the end. If a nozzle with terminal perforations be used in a case where

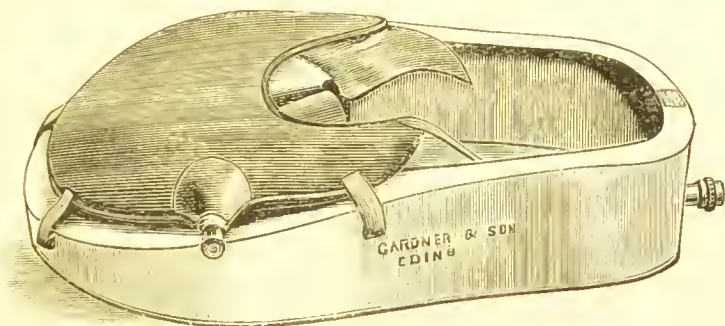


FIG. 37.—Bidet.

the os uteri is patent (*e.g.* after abortion), the head of lotion may force a stream directly into the uterus, along the Fallopian tubes, and thence into the abdominal cavity. Such an accident may be followed by serious symptoms.

Acting on a suggestion offered by one of the authors, Messrs Gardner & Son, Edinburgh, have

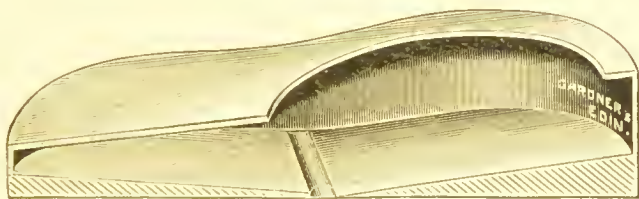


FIG. 38.—Section of Bidet.

devised a special form of bidet, which has been found invaluable. In external appearance it resembles closely the ordinary bidet, but the internal

construction differs greatly from that so long in use (see Fig. 38, Section of Bidet).

The outlet is placed at the side instead of at the lower end. There is a false bottom, consisting of

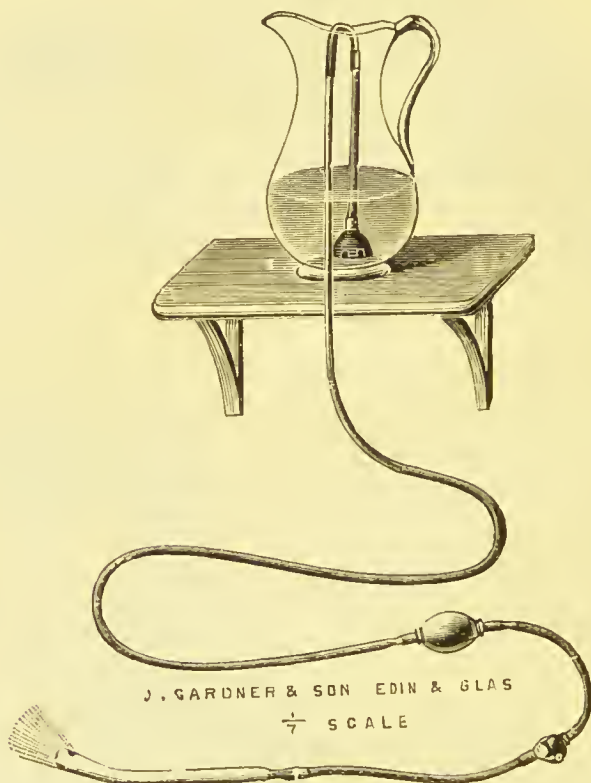


FIG. 39.—Syphon Douche.

two inclined planes which meet in a gutter running from side to side across the centre of the floor of the bidet. The gutter is continued through the side of the bidet into a tube projecting about 1 inch from the side of the apparatus. To this short tube is



attached a brass right-angled tube, which carries off the water or lotion into the pail placed beneath it. It will be readily understood that by this device the bidet cannot overflow, as the water is carried away by the outlet tube as quickly as it enters.

In circumstances where it is impossible to obtain a bidet, an ordinary bed-pan may be used, the patient being moved from time to time to allow of its being emptied.

For the administration of the douche a syphon, or a "Rotunda" douche, as it is sometimes called, may be used, with a ewer to contain the water (see Fig. 39).

The ordinary Higgin-

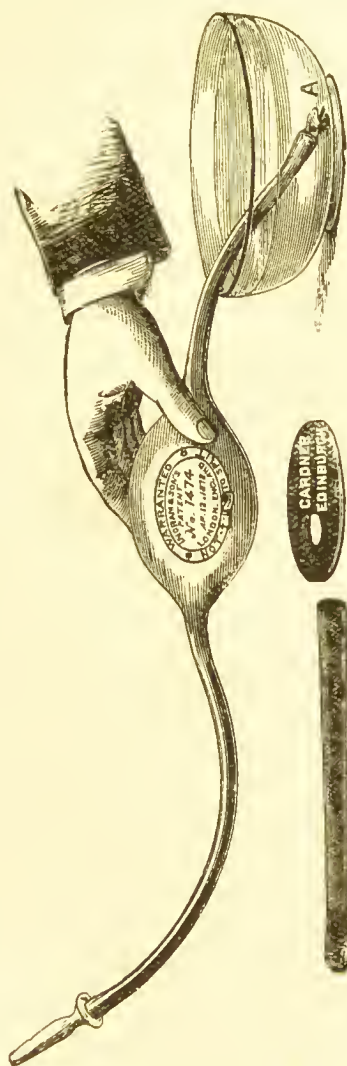


FIG. 40.—Higginson's Syringe.

son's syringe (Fig. 40) is useful where it is desired to wash away discharge from the vagina; it does not



permit, however, of a constant stream, and is therefore not adapted for systematic hot douching.

*Everything appertaining to the giving of a douche must be surgically clean.* It must be fully realised that the least flaw in the chain of asepsis may not only prejudice the health of the patient, but may be fraught with most disastrous consequences.

In cases where the surface of the cavity of the uterus is in a raw condition, as after the operation of curettage or following an abortion, organisms introduced as the result of careless douching may induce the most virulent inflammation.

Before use the douche-can should be thoroughly scalded and cleansed with some antiseptic lotion (*e.g.* lysol, 1-100). The tubing is cleansed at the same time by allowing some of the lotion to run through it. The glass nozzle should be boiled, and, if in continuous use, should be kept in an antiseptic lotion (*e.g.* carbolic, 1-20).

The douche-can and tubing, to ensure of thorough asepsis, should be occasionally boiled. This must be done at once after being employed for a septic case.

The nurse must always have a plentiful supply of hot and of cold sterile water, so that she may add to the douche-can from time to time, as it becomes empty; the temperature is carefully noted by having the thermometer in the can, which should be placed in a convenient position, either standing on a shelf, or hanging on a peg about three feet above the

patient. A gallon of lotion will keep an ordinary douche running for about ten minutes.

When the douche-can requires refilling, it is most important that neither very hot nor very cold water be added while the douche is running. It is only after the temperature of the contents has been accurately taken that the tap should be again turned on.

If this precaution be neglected, one of two things may happen—the patient may either be chilled by the injection of the cold water, or scalded, it may be badly, by the water of too high a temperature.

If a patient is once frightened by the injection of too hot water, the nurse will never regain her confidence.

If a douche of a temperature of  $115^{\circ}$  to  $120^{\circ}$  Fahr. has to be given for more than ten minutes at a time, the external parts, over which the water flows, should be smeared with oil or vaseline before the douche is begun, thus preventing scalding.

The vaginal mucous membrane can endure without pain or injury a much greater heat than the skin surface, and its protection, therefore, is unnecessary, even with a temperature of  $120^{\circ}$  Fahr.

In preparing the douche the greatest care must be exercised in adding to the water the exact quantities of any lotion or powder prescribed by the gynæcologist.

A basin of weak antiseptic lotion with some sterile

cotton wool is necessary for the cleansing of the external genitals.

The temperature required varies with the condition for which the douche is being used. The usual temperature for a simple cleansing douche is  $110^{\circ}$  Fahr., while, for the relief of inflammation and for the arrest of hæmorrhage,  $115^{\circ}$  Fahr., gradually raised to  $118^{\circ}$  or  $120^{\circ}$  Fahr., should be used.

Everything being ready, the bedclothes, with the exception of the covering sheet and one blanket, should be removed, one pillow only being left under the head. The bidet should now be placed at the edge of the bed so that the brass tubing, directed downwards, may reach the pail placed to receive the outflow. The patient should then be placed on the bidet with the knees drawn up. When so placed, the pelvis is on a higher level than the head and shoulders. Should the bidet not be provided with an inflated rubber cushion, a small, soft pillow is placed under the lower part of the back where it rests on the end of the bidet.

The blanket is now doubled over the chest and abdomen, and the lower end of the sheet gathered up in the centre, sufficiently high to be out of the way without unduly exposing the patient (see Plate I., page 80).

After ensuring that everything is in readiness, the nurse must cleanse the hands by thorough washing with soap and water, thereafter rinsing them in anti-

septic solution, *e.g.* lysol (1-100), or corrosive sublimate (1-2000). The external genitals are now cleansed with the antiseptic lotion. The tap of the douche is now turned on for a moment, to allow a little of the water or lotion to run into the pail. By this procedure the air in the tubing is expelled, and the first volume of water or lotion, which is chilled in its passage along the tube, is allowed to escape into the pail.

With the thumb and finger of the left hand the labia majora are now separated, and, while the fluid is flowing, with the right hand the glass nozzle is gently inserted into the vagina, being directed downwards and backwards as far as it can go without undue pressure.

In any manipulations in the region of the external genitals the greatest care should be taken not to interfere with the more sensitive parts which lie to the front.

Hot water is added from time to time as required, with the precautions before mentioned.

In this way the douche can be kept running for any length of time without having to move or uncover the patient. Care should be taken to see that the tube is clamped or the nozzle withdrawn before the douche-can is entirely emptied, otherwise air will enter the vagina. The process of douching should continue for a period of from fifteen to twenty minutes if the patient can bear it for so long.

After withdrawing the nozzle it is advisable to ensure that no fluid is left in the vagina. This is easily done by hooking back the perinæum with the finger introduced into the vagina, or if permissible, by allowing the patient to sit up for a moment before removing the bidet. Otherwise, when the patient resumes the horizontal position the fluid may escape and wet her clothing.

It is hardly necessary to add that, on removing the bidet, the patient should be well dried and made comfortable; the draw-sheet being inspected to note if any of the water or lotion has run down the cleft of the buttocks and passed between the bidet-cushion and the patient's skin, thereby wetting the bed linen. After cleansing the nozzle, it is advisable to place it in a glass jar containing some antiseptic lotion. The nozzle must on no account be used for another patient without previously being boiled.

While the process of douching is going on, it is of great importance to have the patient's pelvis on a higher level than her shoulders. Reference to the diagram (Fig. 41) will show that in this position the lotion is enabled readily to reach the cervix and fill the vaginal roof. The well of hot fluid thus produced results in a beneficial effect analogous to the application of a poultice.

A simple washing out of the vagina, while the patient is in a semi-recumbent position, is often use-

ful for purposes of cleanliness, but is of no avail whatever in modifying inflammation of the uterus

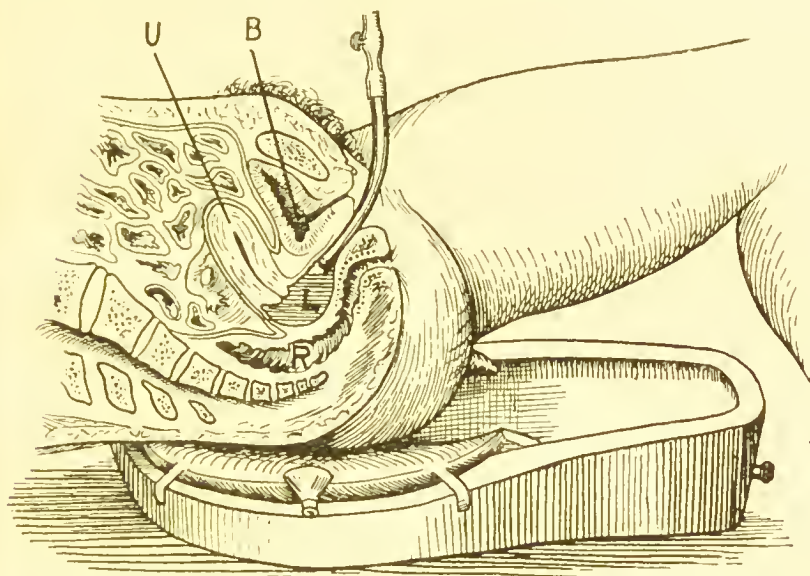


FIG. 41.—Diagram showing the Well of Lotion which collects in Roof of Vagina during Process of Douching. (After Haig Ferguson.)

or its appendages (the ovaries, Fallopian tubes, and broad ligaments).

## CHAPTER VII

### THE VAGINAL TAMPON OR PLUG

THE vaginal tampon is a valuable and easily practised method of treatment directed towards the relief of inflammatory conditions of the uterus, ovaries, and Fallopian tubes. It is also a useful means of arresting certain forms of hæmorrhage.

The beneficial effect of the tampon in the relief of inflammation depends on the medicament which it carries, whilst in the arrest of hæmorrhage the effect is chiefly mechanical.

For application in the treatment of **inflammation** it is made in the following manner. The nurse, having properly cleansed her hands, takes a sheet of absorbent wool about  $\frac{1}{4}$  inch thick, 10 to 12 inches long, and 4 to 5 inches broad, and to one end of this a piece of narrow tape or strong linen thread is tied. The wool is now saturated with the medicament employed; perhaps the most convenient and efficient is glycerine, either alone or containing 10 to 20 per cent. of ichthyol.



The oblong piece of wool is spread out upon a flat surface, and about  $1\frac{1}{2}$  ounces of the medicament poured over it. This done, it is rolled up and twisted into the form of a rope, and, in this way, the medicament is made to permeate every part of the plug, which is now ready for use.

To introduce it, the patient is placed near the edge of the bed, in the left lateral position. A small Cusco or a Fergusson speculum is introduced into the vagina (see pp. 18, 19), and the tampon is carried through it by means of long forceps. It must not be left in the lower part of the vagina, but packed all round the cervix, the vaginal roof, and especially the posterior fornix, in order to be as near the seat of inflammation as possible.

If the vaginal outlet is large, the tampon can be easily and painlessly introduced into the vagina without the aid of the speculum and forceps in the following manner.

With the palm downwards, the index and middle fingers of the left hand, having been lubricated with sterile vaseline or a little white soap, are inserted just within the vaginal orifice. The hand is now turned half-round, palm forwards, and the two fingers held apart, thus forming a kind of director.

The index finger of the right hand now inserts the plug between the separated fingers of the left and, when it has all been introduced into the vagina, the fingers of the left hand are withdrawn, and by

the index, or index and middle fingers of the right hand, the plug is pushed onwards as far as it will go into the fornices.

It is necessary for the patient to use a pad or a sanitary towel to protect her clothing and bed from the watery discharge and the staining which these medicated plugs cause.

Plugs are generally introduced at night, after the evening douche has been given. They are retained all night, and removed just before the morning douche is administered.

In some obstinate cases, where the constant action of the medicament is necessary, the patient is plugged night and morning.

Instead of the plug just described, the bullet-shaped medicated pessary may be prescribed. It is easily introduced by placing the patient upon her left side, the index finger of the left hand being inserted as a director within the vaginal orifice, and then with the index finger of the right hand the pessary is pushed in as far as it will go.

The plug used as a means of checking **hæmorrhage** is different from that just described, and is merely employed as a method of applying firm and continuous pressure to the part.

In many cases requiring this treatment the hæmorrhage is profuse, and accordingly the plug has to be made and introduced without any delay.

For this, a long strip of sterile iodoform gauze is

employed. In an emergency where this is not available, two or three lengths of cotton wool, to one end of each of which a piece of narrow tape is attached, will suffice. These, together with a number of pledgets of the wool, are soaked in carbolic lotion (1-80), corrosive sublimate (1-6000), or even ordinary household vinegar.

The patient is now placed upon her left side, and all blood clots are removed from the vagina by the fingers of the right hand. The index and middle fingers of the left hand having been inserted into the vagina as already described, the lengths of wool are first introduced between them and then pushed well up into the fornices. Care must be taken, however, that the pieces of tape are not entirely pushed within the vaginal orifice. The ends should be left projecting to facilitate removal.

The remaining unpacked portion of the vagina is now filled with the pledgets, as many being used as is necessary to secure a firm plug. The exact number inserted is carefully noted.

A plug, if properly introduced, will check almost any uterine hæmorrhage that may be met with in gynæcological work. It is usually removed after a period of twenty-four hours, but can with perfect safety be retained for forty-eight if necessary.

The small pledgets which lie nearest the vaginal orifice are removed first, and the lengths of cotton wool gently withdrawn by means of the pieces of tape to which they are attached.

The nurse must ascertain that all the pledgets inserted into the vagina are recovered.

*In cases of hæmorrhage the nurse must remember that time is of paramount importance.* If the hæmorrhage is excessive the patient rapidly becomes collapsed, and the least delay may endanger her life. To be efficient every crevice of the vaginal cavity must be firmly packed in order to obtain firm and uniform pressure.

It should be borne in mind that the nurse, whilst entitled to use these methods in an emergency, should send for a doctor immediately in all cases of severe hæmorrhage.

## CHAPTER VIII

### THE INTRA-UTERINE DOUCHE

THE intra-uterine douche is used to stop **hæmorrhage** and to control **sepsis**. It is always of an antiseptic nature, and is given with the strictest antiseptic precautions.

The intra-uterine douche is not so frequently used for gynæcological purposes as in obstetric practice, where it occupies an important position in the treatment of hæmorrhage from the uterus after the birth of the child—post-partum hæmorrhage—and in the treatment of puerperal infection of the uterus, or child-bed fever. In gynæcological practice it is used after the operation of curettage to arrest the severe hæmorrhage which may occur when that operation is performed for the removal of fragments of placenta or membranes left after an incomplete abortion, or in cases of malignant disease. It is also used for the purpose of controlling septic infection of the uterine mucosa, from whatever cause.

For the intra-uterine douche exactly the same

apparatus is required as is used in the vaginal douche (see Chapter VI.). For the uterus, however, instead of the ordinary glass nozzle, it is advisable to use the double-channelled metal catheter. The figure (Fig. 42) represents the instrument devised by Fritsch, which consists, as described in Chapter II., page 28, of a perforated metal tube fitted by a screw over the end of another tube. By the double way thus produced the lotion is allowed to escape from the uterus as quickly as it enters, and the risk of its being re-

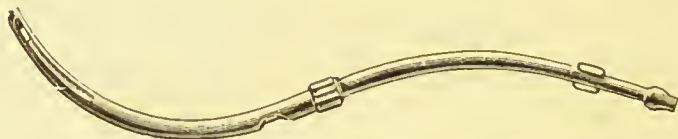


FIG. 42.—Fritsch's Intra-uterine Catheter.

tained in the uterus under pressure and forced along the Fallopian tubes is thus avoided. As in the vaginal douche, the Higginson syringe may be used, but for a constant, steady stream, the head of water provided by the douche-can is essential.

The **temperature of the lotion** used for the intra-uterine douche is different in each of two sets of cases for which it is used. If to control sepsis, it need not be more than 110° Fahr., while for hæmorrhage it should always be 120° Fahr., at which temperature it causes contraction of the blood-vessels of the uterus.

The antiseptic lotion in general use for the intra-

uterine douche is corrosive sublimate (1-4000). As this substance is poisonous and comes into contact with the raw inner surface of the uterus, it can be easily understood how absorption may take place, and lead to symptoms of mercurial poisoning. The corrosive douche, therefore, is always followed by one of hot sterilised water to wash out any of the antiseptic within the uterus. The amount of lotion usually required is a quart, and it should be followed by the same quantity of sterilised water.

In the administration of the intra-uterine douche the most **scrupulous attention to asepsis** must be enjoined; the hands of the administrator must be thoroughly washed, and the vulva must be carefully cleansed with some strong antiseptic lotion, such as corrosive sublimate solution (1-2000). Before giving the intra-uterine douche, the vagina, especially in septic cases, is cleansed with an antiseptic douche; by the omission of this precaution infection may actually be carried into the uterus from the vagina. For the vaginal douche the ordinary glass nozzle is employed, and is replaced by the metal catheter for the administration of the uterine douche.

The patient is placed on the bidet (see Fig. 41, page 93) with her right side at the edge of the bed; the parts are cleansed and the vaginal douche is given. The metal double-way catheter is now attached, and by means of the index and middle fingers of the right hand, which are passed into the vagina as far as the



posterior lip of the cervix, it is guided into the cervical canal. It is gently pushed onwards into the uterus. This description applies to the administration of the douche where the cervical canal is already sufficiently dilated to admit the instrument, such as in cases of puerperal fever, and in hæmorrhage from an incomplete abortion.

Where the bidet is not available, the ordinary bed-pan will be found serviceable. In district work, where neither a bed-pan nor a bidet is available, by placing a pillow under the small of the back, and another lengthwise at the left side of the patient, and covering both with a mackintosh, which is tucked up and draped into a pail at the side of the bed, a douche may be satisfactorily given. The lotion, by virtue of the inclines produced by the pillows, is prevented from escaping on to the bed, and is carried into the pail.

In gynæcological practice, where the uterus is drawn down by means of volsella, and the cervical canal dilated, if necessary, the catheter is introduced into the uterine cavity directly.

The douche-can is filled with the antiseptic lotion of the required temperature, and before inserting the catheter, some of the lotion must be allowed to flow through the catheter, and so expel all air. When it has been introduced into the uterus the douche-can will be raised just sufficiently to allow the lotion to flow freely; the douche-can should not upon any account be raised too high.

The process takes longer than that of vaginal douching, because the douche-can is kept lower, and the rate of the flow thus reduced. Before all the corrosive lotion has flowed from the douche-can, the rubber tubing should be kinked and the hot sterilised water added. In this way the risk of air being injected into the cavity of the uterus is avoided, as would be the case if the hot water were added after the can had become quite empty.

When the prescribed quantities of corrosive lotion and sterilised water have been used and the Fritsch's catheter withdrawn, the bidet is removed, the patient carefully dried, and a large pad of sublimated wool placed over the vulva for the purpose of soaking any fluid which may be returned from the vagina.

The Fritsch's catheter before being used should always be sterilised by boiling. After use it should be taken to pieces and cleaned, as described on page 49.

Although the administration of an intra-uterine douche is described in this chapter, it should be remembered that its practice is rarely entrusted to a nurse.

## CHAPTER IX

### THE USE OF THE CANTHARIDES BLISTER, ETC.

HAVING described the use of the vaginal douche and the medicated tampon or plug, the reader's attention is now directed to a third agent employed in the treatment of pelvic inflammation and pelvic pain, namely, blistering.

A few months' experience in a large gynæcological ward will suffice to teach a nurse and student how common inflammation of the pelvic organs is. They will constantly see patients under treatment for inflammation of the ovaries (ovaritis), of the Fallopian tubes (salpingitis), or of both combined. It may also strike them how very similar the treatment is in all cases where palliative measures alone are adopted.

In private, as in hospital work, cases of ovaritis and salpingitis are the most common gynæcological diseases which the doctor and nurse have under their care, and it is for this reason that it has been considered advisable to devote a small portion of this book to the subject of blistering, which, in conjunction

with the douche and the plug, well-nigh completes the palliative local treatment of these inflammatory conditions.

Blistering may be ordered at any time between the periods. This method of treatment is of great value in relieving the pain which, in ovaritis, etc., precedes menstruation by a few days, and which is not relieved until the menstrual discharge becomes free. The employment of blistering is limited by some gynæcologists to these days.

In a large number of such cases both ovaries, etc., are inflamed, but the left ovary and left Fallopian tube are more frequently affected than those upon the right side.

*Before the application of a fly blister the urine is examined to determine that the kidneys are acting normally.* The irritating material in the blister is absorbed by the skin surface, passing thence into the blood, from which it is excreted by the kidneys. If these organs are unhealthy, an acute inflammation of the kidneys is apt to supervene.

It must be definitely ascertained from the surgeon the desired size of the blister and the exact region to which it is to be applied.

The spot where the patient feels the pain most acutely is invariably the best guide as to where the blister should be applied. This area—called the ovarian region—is familiar to all persons of experience and lies about 2 inches below the level of

the umbilicus, and about  $2\frac{1}{2}$  inches from the middle line.

Before applying the blister, the skin is washed with soap and water, dried, and then rubbed over with a little turpentine or sulphuric ether, poured upon a pledget of wool.

The "face" of the blister, *i.e.*, the black surface which will lie in contact with the skin, is then lightly lubricated with a little sterile oil or vaseline. This lubricating is one of the most important points to be observed in the application, and for two reasons; it acts to some extent as a solvent for the active substance cantharidin, extracting it from the blister, and keeping it in close contact with the skin. It also causes adhesion between the "face" of the blister and the surface to which it is applied—at the same time preventing it from attaching itself too firmly to the bleb when formed.<sup>1</sup>

After being applied it is kept in position by two narrow strips of adhesive plaster.

Having remained in contact with the skin for eight hours, the blister will, as a rule, have "risen." By "rising" is meant the formation of a bleb containing a clear watery fluid known as blood serum. After eight hours, therefore, the plaster strips are detached, and the blister carefully raised and removed. With a pair of thoroughly clean scissors the bleb is

<sup>1</sup> If too much oil or vaseline be put on, the blister will not "rise" at all, because the contact will not be close enough.

incised. This should be done at its most dependent part, in order to allow the fluid to escape entirely.

The part of the bleb incised will, therefore, be that nearest the groin of the patient. The blistered surface must now be treated with care in order to assist it to heal. As a dressing, a piece of surgeon's lint—larger than the raw surface to be dressed—is taken and covered *all over* thinly with sterile zinc oxide or boric ointment. Every part of the lint should be covered so that, should the dressing slip a little, the edge will not stick to the irritated surface.

To remove still further the chance of any adhesion between the lint and the skin, it is a good plan to drop a little antiseptic oil over the ointment when spread, and before applying the dressing. Should the blistered surface require cleansing, oil must always be used for the purpose. The marks left upon the surrounding skin by the strips of plaster may be removed by a little sulphuric ether upon a wool swab. Here, however, care should be taken to prevent the ether from touching the healing surface and causing the patient pain, and this may be effectually prevented by keeping the blistered part completely covered by the dressing while the ether is being used.

The dressing should be changed twice daily—night and morning—and continued until the surface is quite healed.

Attention to the "rising" of the bleb is important, and the blister should not be allowed to remain over the bleb when it has appeared. If carelessly left on, the serum, which is so easily got rid of by a snip with a pair of scissors, coagulates, and cannot escape from the small opening which the nurse makes in the raised-up epidermis. The result of this is, that the whole of the epidermis over the coagulated serum must be removed, and in consequence a nasty raw surface is exposed which may take a long time to heal.



## CHAPTER X

### THE USE OF THE CATHETER

THE use of the catheter is demanded to relieve the patient **when she is unable to pass her urine** naturally. This is frequently necessary in cases after operation, but only when other means have been tried and found ineffective. The application of a hot bag over the lower abdomen, of a hot sponge or fomentation over the vulva, or the introduction of some hot water into the bed-pan may suffice in some cases. In other cases, especially in ward practice, the patient may pass urine without difficulty after the nurse has adopted the simple device of surrounding the bed with screens. In the writers' experience the method advised of pouring water from one vessel to another is rarely attended with success.

The catheter is also necessary for obtaining a "**catheter specimen**" of urine for examination. By this means the urine is collected without the risk of contamination by vaginal discharge.

Among the many duties which devolve upon the gynæcological nurse, one of the most important, and one where the greatest skill and care are demanded, is that of "passing the catheter."

The least oversight may mean infection of the bladder. An inflammatory condition of the lining membrane of this organ (cystitis) is easily induced by the entrance of organisms, and once set up, may entail great suffering to the patient, and may even endanger life.

Care must be taken to ensure that every step of the procedure is conducted with the most stringent attention to asepsis—the catheter must be carefully sterilised, the hands must be thoroughly cleansed, and the external genitals must be, as far as possible, freed from organisms.

Before use the catheter must be boiled for five minutes. A soft rubber male catheter (No. 8 or 9) is serviceable, but the ideal instrument is one made of glass. To allow the urine to run more readily into the vessel provided for it, 4 or 5 inches of sterile rubber tubing may be attached to the outer end of the catheter.

After use the catheter should be carefully cleansed by syringing the channel, first with carbolic lotion (1-20), and then with hot water, special care being directed to the eye of the instrument, where *débris* is apt to accumulate.

After having been thoroughly cleansed, the catheter

should be put into a covered glass dish containing an antiseptic lotion (1-20 carbolic), and kept there until it is again required. Before being used, the antiseptic is removed with sterile water.

Before describing in detail the method to be adopted in the passage of the catheter, one may pause to enforce upon the nurse the danger of the old-fashioned method of passing the instrument "by touch."

The catheter should always be passed "by sight," as by this means only can one take the precautions necessary to prevent it from becoming contaminated by coming in contact with the blankets and the parts of the patient.

The nurse, having made her hands surgically clean, and having prepared a catheter in the manner described above, must place the patient upon her back, or in the left lateral position, with the knees drawn up—a suitable vessel being at hand to receive the urine when withdrawn. By placing the index and middle fingers of the left hand in the cleft of the vulva, and then separating them, the labia majora and minora are drawn widely apart, thus exposing the smooth triangular surface called the vestibule, which, when the parts remain undisturbed, is completely hidden.

About the middle of the base of the triangle an elevation exists, and upon this the urinary meatus can be seen as a pouting, circular opening.

At this stage the vestibule and meatus are care-

fully cleansed by swabbing with carbolic lotion (1-40), or with corrosive sublimate (1-2000), or lysol (1-100), this being done, of course, by the right hand, which is free. Then, by the same hand, the catheter is inserted within the meatus and pushed onwards into the bladder as far as it will go, without using undue pressure. Under normal circumstances the catheter passes easily into the bladder in a direction upwards and backwards, and after being introduced for about  $1\frac{1}{2}$  ins., the urine will be seen to escape.

Gentle and continued pressure on the lower abdomen will be found useful in obtaining a thorough emptying of the bladder. Where a glass catheter is employed the greatest care must be taken with this suprapubic pressure.

Difficulty may be encountered in passing the catheter in those cases where a fibroid tumour of the uterus is firmly plugged in the pelvis, with consequent pressure on the urethra. In some cases of fibroid tumour also the bladder is elevated out of the pelvis and the urethra consequently markedly elongated. In such cases the catheter will have to be passed for a longer distance before the urine is drawn off.

In every case the nurse should be able to tell the surgeon, if required, the direction and length of the urethra, and if any difficulty was encountered in passing the instrument.

Before using the catheter, the nurse must carefully examine it to ensure that the glass is intact. If, in the act of introducing the catheter, it should slip into the vaginal instead of the urethral orifice, the nurse must not again attempt to pass it until it has been thoroughly cleansed.

It is a common practice to use as a lubricant sterile oil or vaseline; this, however, is not necessary, the passage of the catheter without it being neither a difficult process nor painful to the patient.

The urine is allowed to run steadily into the vessel until it begins to come in drops, and then the catheter is drawn out a short distance, allowing the urine to flow once more till it again comes drop by drop. The catheter is now withdrawn, care first being taken to place the thumb tightly over the end of the instrument, or to press the tubing between the finger and thumb as the case may be. By this means, the urine in the channel of the catheter cannot escape upon the surface of the genitals or upon the bedclothes, and the possibility of air being sucked into the bladder is prevented.

When catheters are in daily use and it is desired to have a constant supply ready, a dozen or so may be conveniently sterilised and kept in readiness in a corresponding number of large test-tubes containing sterile water.

The catheters are each placed, eye downwards, in

the test-tube, which must be somewhat larger than the catheter. For an ordinary catheter of 7 ins. in length a test-tube of 8 or 9 ins. long is required.

The tubes with a catheter inside each are placed in the steriliser containing water, and boiled for five minutes. To prevent any possibility of the glass being broken as the result of the vigorous movements of the boiling water, the tubes should be rolled tightly in a towel.

The water is now allowed to cool, and each tube is carefully lifted out, retaining enough of the sterile water to just cover the catheter. The mouth of the test-tube is now plugged tightly with sterile wool, which is retained in position by means of a piece of strapping (see Fig. 43).

By this means a constant supply of sterile catheters is readily procured. Besides affording a very serviceable procedure for ordinary hospital purposes, this method of preparation allows of



FIG. 43.—Test-tube with Catheter.

the sterile catheter being conveniently carried in the district nurse's bag.

When required for use, the catheter is warmed by holding the tube in a stream of hot water, the strapping and sterile wool plug are then removed, the tube is inverted, and the catheter is deposited in the hand of the nurse, which has, of course, been carefully cleansed.



## CHAPTER XI

### THE EXAMINATION OF THE FEMALE BLADDER

THE condition of the female bladder may be investigated by different methods, direct and indirect.

The presence of abnormal constituents in the **urine**, such as pus, blood, and organisms, may indicate a diseased state of the bladder. If associated with pain in the lower abdomen, and in the region of the external genitals and perinæum, increased during and after the act of micturition, with at the same time frequency of micturition, the presence of these abnormal constituents in the urine strongly suggests the bladder as the seat of mischief. If, on the other hand, this diseased state of the urine be associated with pain in the small of the back and the flank, and especially if it shoot down towards the labia, the kidney is in all probability the organ diseased. A combination of these symptoms points to disease of both bladder and kidney. The evidence so obtained, however,

is at the best only presumptive, and for accuracy in diagnosis more direct methods of examination are essential.

**Percussion of the Abdomen** may reveal the presence of dulness extending above the pubis, due to distension of the bladder.

In the relaxed state of the vaginal outlet and perineum the bladder may become displaced downwards, and on **inspection** is seen to project through the vulvar orifice as a soft, rounded swelling, covered by the anterior vaginal wall; if the patient strain down, the swelling is seen to increase in size. The term applied to this prolapsed state of the bladder is *cystocele*.

The close anatomical relations which exist between the anterior vaginal wall and the bladder permit of the **palpation** of the base of that organ from the vagina, and the presence of tenderness or thickening in that region may point to inflammation or tumour growth.

In other cases, also, the bladder may be palpated between the two hands, as in the ordinary bimanual examination; it may be grasped and rolled between the fingers in the vagina and the abdominal hand, pressing firmly downwards close behind the pubis. A thickened and hardened, or a distended bladder, may thus frequently be recognised.

In some cases the presence of a stone or tumour

in the bladder may be recognised by means of the bladder sound (Fig. 44).



FIG. 44.—Female Bladder Sound.

When it is desired to obtain positive information about the condition of the lining membrane of the bladder, direct inspection of the interior of that organ is necessary.

**Direct Inspection of the Interior of the Bladder.**  
—In this way the presence of inflammation of the mucous membrane of the bladder (cystitis) is revealed, the position and nature of any tumour growth is recognised, and suitable applications can thus be made to any ulcerated surfaces. By this means, also, the condition of the orifices of the ureters is discovered, and the appearance of the urine which is seen to escape from each testifies to the condition of the corresponding kidney. Where necessary, also, the gynæcologist can introduce fine bougies into the ureters for the purpose of discovering the presence, and estimating the degree, of any stricture of these ducts, or he can introduce ureteral catheters to collect the urine directly from each kidney for testing purposes.

As the result of the great improvement within recent years in the methods and instruments employed, direct inspection of the interior of the bladder has been placed in the front rank of kidney and

bladder investigation, and is now one of the most valuable and perfect procedures in gynæcological practice.

By the use of special instruments, called *Cystoscopes*, which are passed along the urethra, the interior of the bladder is illuminated and inspected directly.

*Electric Cystoscope*.—In this instrument the bladder is distended with sterile water and illuminated by means of a small electric lamp, situated at the inner end of the cystoscope. This is passed along the urethra, the different parts of the bladder are illuminated in succession, and viewed by placing the eye against the eyepiece and looking along the bore of the instrument.

**Kelly's Cystoscope**.—This is the most satisfactory method of direct inspection of the inner surface of the female bladder, and was devised by Dr Kelly of Baltimore. Its practice depends upon the fact that the female urethra can accommodate, sometimes only after dilatation, a tubular speculum or cystoscope, along which the inner surface of the bladder may be illuminated by means of the ordinary head-lamp used in laryngeal examination.

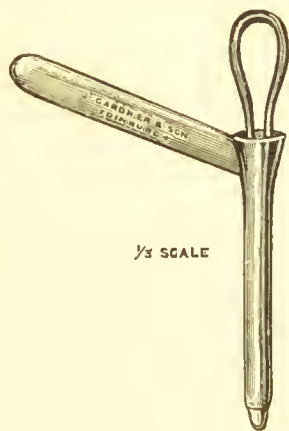


FIG. 45.—Cystoscope.

The special instruments employed in this procedure are as follows:—Kelly's cystoscope (Fig. 45), which is supplied in four sizes, 8, 10, 12, 14, the figures indi-



FIG. 46.—Urethral Calibrator.

cating the diameter of the speculum in millimetres; urethral calibrator (Fig. 46); long bladder forceps



FIG. 47.—Bladder Forceps.

(Fig. 47); ureteral searcher (Fig. 48); an evacuator to suck out from the bladder the urine which is

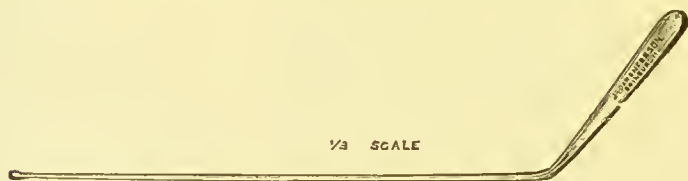


FIG. 48.—Ureteral Searcher.

secreted during the examination, and which tends to obscure the inspection (Fig. 49). Instead of this a glass syringe in good working order, and fitted with a piece of rubber tubing, from 6 to 8 inches long, and about the diameter of a No. 9 catheter, may be used.

In addition to these the fine ureteral catheter (Fig. 50) and the ureteral probe may be required.

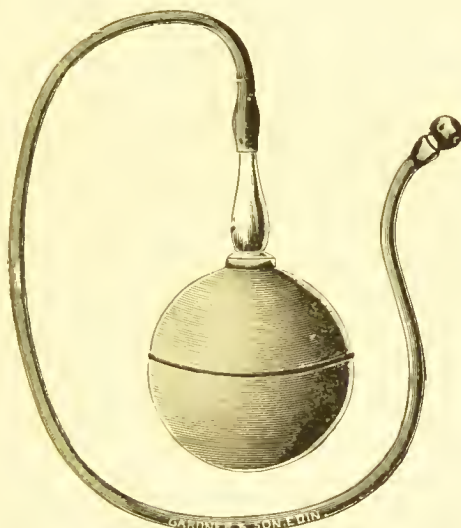


FIG. 49.—Urine Evacuator.

The instruments are well cleaned and sterilised, and placed in a shallow instrument tray containing



FIG. 50.—Ureteral Catheter.

hot sterile water, in sufficient quantity to completely cover them.

In addition to the above instruments the following should be ready :—

A well-polished laryngoscopic head-mirror.

A small reflecting lamp capable of giving a bright light.

A Kelly's rubber pad (see Fig. 62, page 176).

A sterilised glass catheter.

A douche-can fitted with rubber tubing, to which is attached a Fritsch's double catheter previously sterilised by boiling.

Two quarts of boracic lotion (1-40) or sterile water, according to the surgeon's directions.

A bath thermometer previously carbolised.

A pail to receive lotion.

A large hard pillow covered with mackintosh.

Sterilised linen stockings—to be put on above the woollen pair when the patient is being prepared for the examination—and a lithotomy sheet. (See Preparation for Minor Operations.)

A basin of warm corrosive sublimate lotion (1-1000), in which lie pieces of sterile wool to be used as swabs for cleansing the external genitals before any instruments may be passed into the urethra.

Lysol and turpentine soap or carbolic soap, with which to cleanse the parts before swabbing with boracic.

Before posturing the patient, the external genitals are cleansed with soap and water, and then with swabs soaked in an antiseptic, and the urine is drawn off with the glass catheter.

*Method of Examination.*—The examination by Kelly's method may be made with or without the administration of a general anæsthetic. In a nervous



woman a general anæsthetic is indispensable for an efficient examination.

The principle of the method is based upon the fact that, when the patient is postured with the pelvis on a higher level than the abdomen and thorax, the "pitch" given to the pelvis causes the abdominal contents to fall away towards the diaphragm, and, when the urethra is dilated, air is sucked into the bladder, thus distending and facilitating the examination of its walls.

To attain this object the patient may be placed in the Genu-pectoral or the Exaggerated Lithotomy position (see Chapter V.). In the exaggerated lithotomy position the patient, after the garments have been loosened and rolled up to be well out of the way, is brought to the end of the table, as in the ordinary lithotomy position (Fig. 51). The hips are now raised on the firm mackintosh-covered pillow. The legs may be held in position by two nurses, or by means of the vertical uprights fixed to the table. If the legs are supported in the correct way each nurse should have a hand free, one for holding the lamp and one for passing the lotion and swabs, etc., to the examiner.

In the Genu-pectoral or Knee-Chest position the patient is placed as near the end of the table as is consistent with comfort, and rests on the knees with the thighs approximately vertical to the table; the chest is depressed towards the table, and the side of

the face touches the table. The patient may be thus held by two assistants or by means of the vertical uprights. When an anæsthetic is employed the former method is the better.

The genu-pectoral position gives better distension of the bladder, but where an anæsthetic is not



FIG. 51.—Inspection of Bladder—Cystoscope in Position, and Light supplied from Electric Lamp. (After Kelly.)

administered the less fatiguing for the patient is the exaggerated lithotomy position.

After the patient is postured, the sterilised stockings and the lithotomy sheet are put on. The room is darkened by pulling down the blinds and closing the doors.

The reflecting mirror is fixed to the forehead of the examiner, and the lamp is held just above the

patient. The nurse who holds the lamp must be careful to keep it at a safe distance from the skin to avoid the danger of burning the patient. If the light be strong it is a safe practice to place a folded towel over the skin immediately beneath the lamp.

By means of the graduated calibrator the diameter of the urethral canal is calculated. If necessary, it is dilated to a sufficient size to permit of the entrance of a No. 10 or No. 12 cystoscope, which for ordinary examination purposes is quite large enough. The cystoscope is now gently forced along the urethra, being rotated from side to side in the process; to prevent laceration of the mucous membrane of the urethra, the rounded plug or obturator which is seen to project from the inner end of the instrument, must be retained in position till the bladder is reached.

As the result of the suction action produced in the pelvis by the position assumed, immediately on the removal of the obturator air enters the bladder with a sudden audible rush, distending its walls, which may now easily be examined by directing the light along the speculum to the different areas in succession.

Should the examination be a prolonged one the surgeon will, from time to time, ask for the syringe and rubber tubing with which to remove any urine that may have accumulated in the bladder.

After the examination is completed it is necessary to thoroughly wash out the bladder, which, from

exposure to the atmosphere, may have become slightly infected. Accordingly the pillows are removed and the Kelly's pad is placed beneath the patient's hips. A pail is placed upon the floor and the flap of the apron draped into it. The nurse must now see that the lotion, boracic (1-40), or sterile water, as the case may be, is at a temperature not exceeding 100° Fahr. After making certain that her hands are in an aseptic state, she will give the urethra and vestibule a final swabbing with corrosive lotion (1-2000), and introduce the double-channelled uterine catheter, which can easily pass along the dilated urethra; through it a little of the lotion must be first allowed to run, to take off the chill caused by passing through the tubing and to prevent the injection of air. One quart of lotion is sufficient for the douche.

The patient's buttocks are now carefully dried, the Kelly's apron removed, and with her clothing properly arranged she is put back to bed.

It is a wise precaution to place a large pad of sublimated wool under the hips. This, of course, is done when the patient is in bed; and its object is to soak up any urine that may trickle from the bladder through the dilated urethra.

After an ordinary examination of the bladder by Kelly's method, the dilated urethra contracts to its normal size within a very short time.

Should the operator during the examination introduce his finger into the bladder to explore

its cavity, incontinence for several hours and sometimes for a day or two may occasionally result. In such a case it is advisable to keep the patient on a rubber bed-pan, attention being given to the state of the skin.

Should the incontinence last longer than expected, the application of the electrodes of an electric battery may suffice to restore the tone of the dilated sphincter—one electrode being placed over the spine just above the “small of the back,” while the other is held against the abdomen in the middle line just above the pubes.

To complete the description of this method of examination it must be stated that by its means the examiner may investigate the condition of the ureters. In locating the position of the orifices of these ducts the ureteral searcher is found useful. The condition of the orifices, whether inflamed or ulcerated on one or both sides, etc., is easily recognised, and the presence of any stricture of the ducts is revealed by the passage of the long, slender ureteral bougies. To draw off the urine from the kidney directly for purposes of examination, the ureteral catheter is employed.

In some cases, also, this method is employed as a preliminary to the operation of Hysterectomy (removal of the uterus) by the vaginal or the abdominal route, where the surgeon desires to pass the bougies for the purpose of stiffening the ureters. By this

means the ureters are readily recognised and located during the operation, and the risk of their being

accidentally injured is thus diminished.

In this chapter mention must also be made of another method of examination which has been devised for the purpose of obtaining samples of the urine as secreted by each kidney. The figure (Fig. 52) represents the instrument used for this purpose. After the bladder has been thoroughly washed out and emptied, the **Urine Separator** is passed along the urethra till the curved inner end rests in the middle line of the base of the bladder. The screw

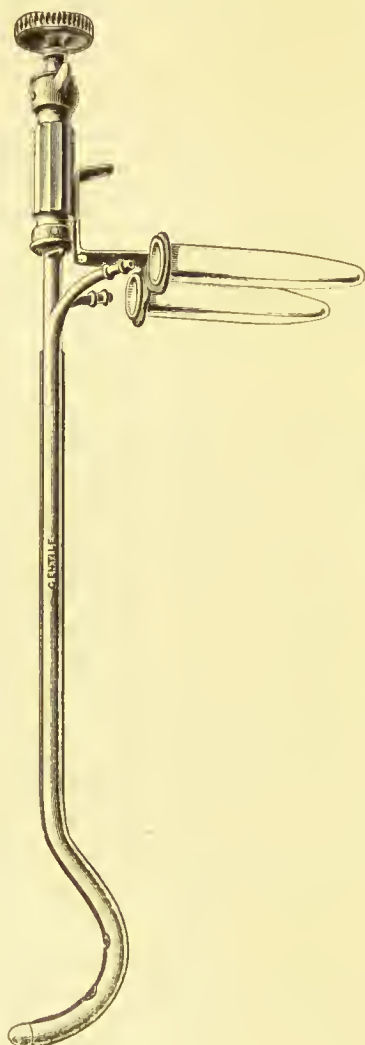


FIG. 52.—Luy's Urine Separator.

at the outer end of the instrument is now turned and a thin rubber partition is stretched across the

concave end, thus dividing the region at the base of the bladder into two spaces. When the patient is placed in the sitting posture, the urine from each kidney falls into its own compartment, and is collected by means of the catheter represented in the figure.



## CHAPTER XII

### IRRIGATION OF THE BLADDER

THE washing out of the bladder is a form of treatment often required for the alleviation of some forms of inflammation of the mucous membrane of the bladder (cystitis) which have resisted ordinary medical treatment.

It is also a common and very important part of the after-treatment of operations upon the bladder itself, *e.g.* after the repair of a vesico-vaginal fistula. (See Chapter XX.).

Irrigation of the bladder is occasionally employed with great benefit in the treatment of **acute cystitis**. In such cases it is used only after the acute pain has been overcome by internal medicines. In some forms of this disease, especially that due to gonorrhœal infection, where the administration of drugs has failed to relieve the pain, the periodic irrigation of the bladder forms a valuable adjuvant to the medicinal treatment; in such cases a few irrigations are often followed by a marked reduction in the acute symptoms.

The greatest use, however, of bladder irrigation is found in cases of **chronic cystitis**, where the bladder frequently becomes thickened and contracted, accommodating at the most only 1 oz. or even less of fluid. This fact explains the tiresome frequency of micturition for which the patient so often solicits advice.

For the purpose of combating the organismal infection responsible for the inflamed mucous membrane of the bladder, antiseptic solutions are employed for the irrigation. As this mucosa is extremely sensitive, only weak solutions are tolerated. Perhaps the most convenient and satisfactory solution is boracic lotion (1-40). In the more virulent cases, *e.g.* gonorrhœal, silver nitrate solution (1-1000) proves a more efficient antiseptic.

One or more quarts of the lotion will be necessary. The temperature of the solution should be about 100° Fahr.

The irrigation may be practised once every day, or in more severe cases every morning and evening. As the employment of silver nitrate solution is apt to be accompanied with pain, it is advisable to use it only every second day, varying it on the alternate days with the milder boracic lotion.

The bladder may be washed out by one of several methods, each of which has its advocates. The two most frequently adopted are, firstly, that in which the fluid is gently forced into the bladder by means

of a syringe, and, secondly, that in which, as in the vaginal douche, the principle of the head of water is employed, and the fluid gently directed into the bladder from a funnel elevated above the patient's bed.

**Syringe Method.**—The instruments necessary for this method of washing out the bladder are: a large-sized catheter (No. 10 or 11), if possible with a funnel expansion at the outer end, and a Higginson's syringe (Fig. 40, page 87), the latter fitted with a fine-pointed nozzle, preferably of metal, in order to allow of its being boiled.

Before proceeding to inject the lotion into the bladder, it is necessary to pass the catheter and draw off the urine in the manner described in Chapter X. The catheter is left in position, and to it the pointed nozzle of the syringe is connected.

Note specially, however, that before the nozzle of the Higginson is connected with the catheter, it is absolutely necessary that all air should be expelled from the syringe; if forced into the bladder it is apt to give rise to pain and discomfort. This is done in the usual way by giving the ball of the syringe several compressions, while both the nozzle and the valve end are kept well down in the basin of lotion about to be used.

This precaution having been taken, the nozzle is carefully connected with the catheter and the

lotion slowly injected into the bladder, until the patient is conscious of a desire to micturate.

If a Higginson's syringe is in perfect working order, one compression of the ball will inject an ounce and a half of lotion.

Knowing this, in washing out the bladder one can calculate approximately how much lotion has been injected, by observing how many times the ball of the syringe has been compressed. When the bladder has been filled to the greatest extent the patient can bear, the injection must cease, and the lotion, having remained for a number of seconds, is allowed to flow back by disconnecting the nozzle of the syringe from the catheter.

After all the lotion has escaped, the process is repeated not less than six times, and oftener in cases in which the lotion persists in returning turbid, in which case it should be continued until it is returned perfectly clear.

**Syphon Method.**—For this method a medium glass funnel (4 ins. diameter) is required, connected by means of a yard of rubber tubing with a No. 10 red rubber catheter. The catheter is easily fitted to the tubing by means of an intervening length of glass tubing (see Fig. 53). The apparatus can be sterilised by boiling.

The external genitals are cleansed carefully. Before use the lotion to be used is poured into the

funnel and allowed to escape from the catheter. By this means the contained air is dispelled. The

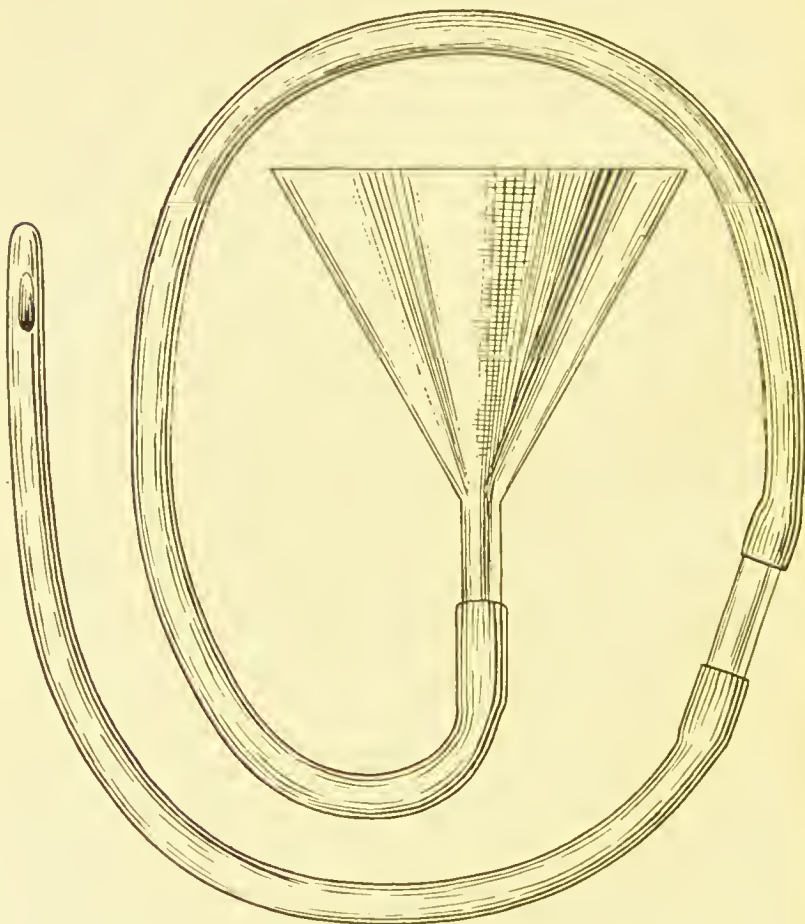


FIG. 53.—Apparatus for Irrigation of Bladder.

catheter is now introduced along the urethra, the tubing being constricted between the finger and thumb in the process. By elevating the funnel the

fluid is gently forced into the bladder until the patient experiences the sensation of distension. The fluid is allowed to remain for a short time in the bladder, and by depressing the funnel below the level of the bed, the fluid, mixed with the urine present in the bladder, escapes by the syphon action thus called into play into the pail provided for it.

This process is repeated as in the previous method till the returning fluid is quite clear.

It is advisable during the process to engage the patient in conversation and so try to divert her attention from what is taking place. In this way, especially when she is of a nervous temperament, it will be found that the operation can be carried out much more successfully, and one will often be able to inject a much larger quantity of lotion into the bladder than would have been otherwise possible.

The benefits derived from irrigating the bladder in cases of cystitis are many. In the first place the fluid stream clears away the purulent *débris* which collects at the base of the bladder, and which the process of micturition fails to discharge entirely. The force of the entering fluid, also, tends to open out the crevices between the mucous folds in which the bacteria lurk, and thus allows of the antiseptic influence of the lotion being conveyed to every part of the bladder surface. The heat of the lotion, in

addition, exercises a helpful influence in the inflammatory condition of the bladder walls.

Where the capacity of the bladder is markedly diminished by the painful and continuous spasm of the walls, this spasm is gradually reduced and ultimately overcome as the result of a course of bladder irrigation. So also, even in the cases of chronic cystitis where the bladder walls are thickened and contracted, and the instillation of even an ounce of fluid is not tolerated, with patience and perseverance the capacity may be gradually increased to 10 ozs., 15 ozs., or even more.



## CHAPTER XIII

### THE EXAMINATION OF THE RECTUM

THE rectum may be examined by palpation or by inspection.

**Palpation.**—As already mentioned in Chapter V., the rectum is a convenient route for the examination of the pelvic organs in an unmarried girl where it is desired to avoid the pain and nervous excitement attendant on a vaginal examination. In other cases the rectal examination by means of the finger may be necessary to supplement the ordinary vaginal and bimanual examinations. With the finger of the right hand in the rectum and the left hand on the lower abdomen a bimanual examination may give useful information about the state of the uterus, tubes, and ovaries. One of the most efficient methods of pelvic examination, also, is the recto-vaginal bimanual examination.

In most cases, however, a digital examination of the rectum is made for the purpose of investigating

the condition of the rectum itself where the symptoms of the patient suggest some diseased state of the lower bowel.

**Digital Examination of the Rectum.**—In making the examination the finger should be protected by means of a thin finger-stall or a rubber glove.

The patient may lie in the left lateral position, or the dorsal position, with the knees drawn up and the soles of the feet resting flat on the table. By feeling the tip of the coccyx and carrying the examining finger, usually the index finger of the right hand, forwards in contact with the skin, the anal orifice is readily recognised. To relax the external sphincter muscle the patient is desired to strain down, and the finger, which to facilitate its introduction should be freely lubricated with vaseline, is gently forced upwards and forwards through the anal orifice. To prevent pain in the introduction of the finger the necessity of having it thoroughly lubricated cannot be too much emphasised.

As shown in Chapter I., the rectum turns downwards and backwards to open at the anal orifice—this fact must be borne in mind in the introduction of the finger.

The examining finger may recognise the presence of external or internal *piles*, due to the backward pressure on the veins frequently associated with pelvic trouble. In the large majority of cases,

however, the existence of internal piles is not recognisable to touch. The presence of severe pain during the introduction of the finger may indicate the presence of a *fissure* just within the anal orifice.

As the finger is pushed onwards the rectum is suddenly felt to expand and passes backwards into the hollow of the sacrum. By carrying the finger to the anterior wall the *cervix uteri* is felt distinctly pressing downwards and backwards against the anterior rectal wall—by the inexperienced this is often mistaken for a pelvic tumour. The presence of any stricture or tumour growth, or enlarged pelvic glands, may be revealed by the examination.

**Inspection.**—In cases where the diagnosis is doubtful, and where it is desired to recognise the characters of, and apply caustic to, an ulcer, examination of the rectum by inspection is of great use.

The administration of an anæsthetic is unnecessary except in patients of a nervous temperament.

The examination may be made by means of an ordinary rectal speculum—one of the bivalve pattern is represented in the figure (Fig. 54). The most convenient position for this examination is the left lateral position. The patient is brought well over to the edge of the bed. The speculum is warmed and the outer surfaces of the blades are lubricated with vaseline. The instrument is gently introduced through the anal orifice, and by means of the screw

the blades can be separated to the required degree. The blades of the instrument open laterally. By directing the light—sunlight is sufficient if bright—

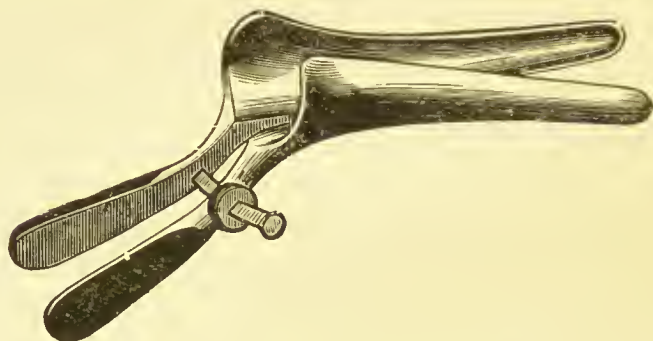


FIG. 54.—Bivalve Rectal Speculum.

along the instrument, the lower end of the rectum is brought into view.

Where an examination of the mucous membrane of the rectum at a higher level is desired, the postural method of examination devised by Dr Kelly is found valuable.

**Kelly's Method for Inspection of Rectum.**—For this method of examination the long rectal speculum or Proctoscope with obturator (Fig. 55) is required. This may be obtained in two lengths, although, of course, the longer instrument may be quite conveniently employed for the examination at lower levels. Besides the speculum, one or two pairs of long forceps or sponge-holders to hold pledgets of gauze, and the reflecting head-mirror (laryngoscopic) and electric lamp are necessary.

Where good light may be had during the day from windows, by placing the patient on the table *with the buttocks away from the light*, the lamp may be dispensed with, and the speculum illuminated by the mirror on the forehead of the operator.

The preparation for a rectal examination differs in some respects from the usual preparation of a patient.



FIG. 55.—Kelly's Proctoscope.

As the bowel itself is the part to be examined, its special preparation requires attention.

It is the custom in ordinary cases to give castor oil to the patient on the night before the examination is to be made, and to follow this by an enema in the morning. If this be done it will frequently be found that some of the enema has not been returned, and also that fæcal matter brought low down into the rectum by the enema has not been

expelled. This unclean condition of the bowel materially interferes with the proper examination of its walls.

The nurse's aim should be to have the patient's rectum as clean as possible, and quite empty at the time of examination. This may be effected in the following way. Castor oil is given about 3 P.M. on the day preceding the examination. As a result the bowels will in all probability move freely in the early evening of the same day or before midnight. Two hours after they have moved a large soap and water enema should be given. No second enema need be given, and the bowels should not be further disturbed.

As regards the giving of food to the patient after the castor oil has been administered, it is necessary to remember that it is advisable to give as little as possible, so that there may be a minimum residue. The patient should have only a very light tea in the afternoon of the previous day, no supper in the evening, and the usual small cup of tea with toast in the early morning.

The best position for the examination is the genu-pectoral or knee-chest posture (see Chapter V.). The patient is placed as in the corresponding method of examination of the bladder, and may be supported by two assistants, or by means of the vertical uprights fitted to the end of the table (see Fig. 56). In this position the greatest care should be taken to expose



the patient as little as possible; she should be covered by a sheet similar to that used for operations in the lithotomy posture.

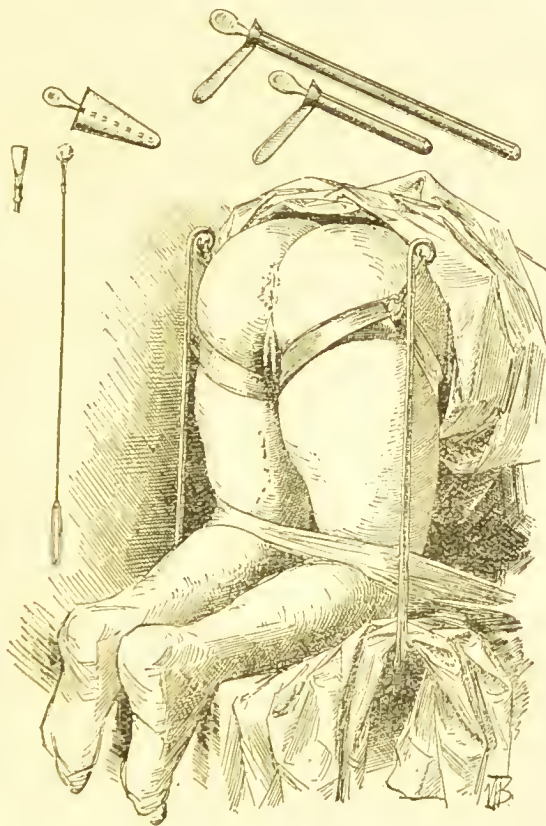


FIG. 56.—Postural Examination of Rectum. (After Kelly.)

The buttocks are separated, and the speculum, which has been warmed and lubricated with vaseline, is forced gently through the anal orifice. The end of the instrument is firmly grasped in the palm of the



hand, and the obturator is kept securely in position, thus preventing the mucous membrane of the rectum from being lacerated by the end of the speculum. The instrument is pushed downwards and forwards in the direction of the anal canal; the handle is now depressed, and the speculum pushed upwards and backwards into the sacral hollow. When the instrument has been introduced to the required distance the obturator is removed, and the air rushes into and balloons the rectal cavity, as in the corresponding method of bladder examination.

The light is now reflected into the rectal cavity by means of the reflecting mirror on the head of the examiner, and the rectal walls are systematically examined. As the speculum is being withdrawn, the walls of the rectum close in on the end of the instrument, and the different levels are thus examined in succession.

In cases of advanced malignant disease of the bowel, where there is much discharge in the form of an obstinate diarrhœa, it is well-nigh impossible to thoroughly cleanse the rectum. This has often to be done by the operator himself after he has introduced the speculum, and for the removal of mucus, etc., the long narrow forceps or sponge-holders carrying small gauze swabs are required. Gauze is preferable to wool for the swabs; if wool be employed fragments are apt to become detached in the rectum.

This mode of examination is not confined to the lower levels of the rectum. By means of a longer speculum the upper regions of the rectum, and even the bowel above—the sigmoid flexure—may be explored. The instrument devised by Dr Kelly for this purpose is called the Sigmoidoscope.

## CHAPTER XIV

### GONORRHŒA

A SHORT description of gonorrhœa, a disease which is frequently encountered in gynæcological practice, must be included in these notes. As already mentioned in the chapter devoted to the consideration of the organisms met with in diseases of the female genital tract (Chapter III.), this condition is due to infection by the organisms known as **Gonococci**. These consist of minute, dot-like germs, and are usually found in pairs.

Gonorrhœa, in a large number of cases, commences as a purely local condition, and usually in the form of an acute inflammation of the vulva (vulvitis).

A patient suffering from gonorrhœal vulvitis complains of severe pain located in the external genitals, and of pain whilst passing water. On examination the parts are found to be swollen, red, and tender, and are bathed in a greenish-yellow purulent discharge. The urethral orifice is inflamed and swollen, and is seen to exude a drop of pus. If, at the time

of examination, there is no purulent discharge from the urethra, a drop of pus may be forced out of the orifice by introducing the finger into the vagina and gently stroking the urethra from behind forwards. By staining a drop of the discharge with the appropriate dyes and subjecting it to microscopic examination, the presence of the gonococci is revealed.

If the gonorrhœal infection escapes detection, and is not strenuously combated in the earlier stages, it may spread upwards and induce an acute inflammation in the vagina (vaginitis), in the uterus (endometritis), in the Fallopian tube (salpingitis), or in the ovary (ovaritis). In some cases the gonococcal inflammation becomes located in the tube and forms there a tubal abscess (pyosalpinx). From the tube the gonococci may pass directly to the pelvic peritoneum and produce a pelvic peritonitis.

In examining a gonorrhœal case, the hands should be protected from contamination by the infective material by means of rubber gloves. The greatest care should be taken to destroy or subject to the most rigorous sterilisation any materials or instruments used for a patient who is the victim of gonococcal infection. All instruments, towels, etc., used by her should be set aside exclusively for her use, for the gonococci may easily be transmitted from one patient to another, and are particularly apt to give rise to a virulent inflammation of the mucous

membrane of the eyelid and eyeball (gonorrhœal conjunctivitis).

To safeguard the patient against the dangers attendant on gonococcal infection, the disease should, when possible, be treated with radical measures in the earliest stages. If the gonococci are allowed to invade the higher levels of the genital tract, their extermination is extremely difficult. They induce an intractable chronic inflammation of the pelvic organs, associated with pain and discomfort, and may reduce the patient to the state of a chronic invalid.

On examining the patient we often elicit the information that she has been treating herself with simple douches of hot water, or perhaps a solution of alum, in the vain hope of arresting the progress of the disease. These half measures, in all probability, do more harm than good, by carrying the organisms to a higher level.

For the destruction of the organisms a strong antiseptic is necessary, and for effective treatment the infected surfaces must be subjected to its continuous action for a considerable period of time. In the earlier stages the chief treatment is directed towards the vulva and the vagina, which, if not actually inflamed, in all probability lodges large numbers of the organisms.

For the vagina *corrosive sublimate* is generally prescribed—in the form of a douche, and by

means of a vaginal plug soaked in a solution of the antiseptic.

The **douche** need not be stronger than 1-4000 corrosive lotion, and should be given night and morning. One or two quarts will be sufficient at a time, and the glass nozzle must be carried well up to the vaginal roof.

After the evening douche has been given, the antiseptic influence is continued by inserting a plug soaked in a corrosive solution into the vagina; this must be done almost as carefully as if for the arrest of hæmorrhage (see Chapter VII.).

In this disease the folds or rugæ of the mucous membrane of the vagina become, as a result of the acute inflammation, very large and swollen; and, consequently, the furrows between the ridges become much deeper. The douche may cleanse the ridges, but it does not reach the deep crevices in which the discharge, teeming with the infective organism, still remains.

To apply the **antiseptic plug**, therefore, to every part of the surface, it is necessary to stretch the vaginal walls, so that the ridges may be flattened, and the furrows, consequently, brought into contact with the antiseptic. A large plug well packed into every part of the vagina will accomplish this. It is made of iodoform gauze soaked in corrosive lotion (1-2000), the excess being wrung out. In order to introduce it satisfactorily the Sims' posture should be

employed, and, in addition, it is always advisable to use the vaginal speculum, as the walls of the vagina have been rendered so abnormally tender by the acute inflammation that any but the gentlest manipulation is almost unbearable.

When the plug has been introduced and tightly packed in, the speculum is withdrawn by the left hand. In its removal one is very apt to dislodge the plug from the vaginal roof, and, therefore, while the instrument is being slowly withdrawn, the nurse must press the gauze firmly upwards with the fore-finger of the right hand.

Plugging once in twenty-four hours is all that is necessary. This is generally done after the evening douche, the plug being removed before the morning douche is given.

In addition to the vaginal condition, it will often be found that the urethra and bladder are in a state of acute inflammation. These complications will be treated by the internal administration of the appropriate urinary antiseptics and sedatives.

For the acute vulvar inflammation it is advisable to have the parts well cleansed, powdered with some non-irritating material, such as equal parts of boric powder and talc, and above all separated by means of a folded piece of iodoform gauze retained in position by a T-bandage.

Sometimes, even though the greatest care be taken in inserting the plugs, a slight excoriation will appear



near the vaginal orifice. This greatly increases the pain caused by the insertion, and, in such a case, after the douche has been given, a small piece of cotton wool, soaked in a 5 per cent. solution of cocaine, should be applied and left in contact with the raw surface for two or three minutes, after which the plug may be introduced with comparative ease and comfort.

In using mercurial douches and plugs, the nurse must always remember that the mucous membrane of the vagina is absorbent, and should the patient, after some days, complain of sore gums, foul breath, etc., the presence of mercurial poisoning is indicated, and the plugging and douching with corrosive sublimate should at once be stopped until every poisonous symptom has disappeared, after which it may again be employed. In the interval, simple douches of boracic lotion should be given, and the vagina packed with iodoform gauze.

All plugs, wool, etc., used in these cases should be at once destroyed, as also the glass vaginal nozzle when the treatment is ended. Warning should also be given to the patient that she must on no account touch the genitals, as infection is easily conveyed to the eyes, setting up an inflammation so acute that it may result in the destruction of the whole eye.

The speculum and all instruments used should be boiled after use. All basins, etc., must, likewise, be thoroughly cleansed, and the nurse should take great

care of her own fingers so as to avoid transmitting the disease to other patients.

This course of treatment should be continued till the inflammatory symptoms and discharge have disappeared. The plug is first discontinued, whilst the douche is carried on for a considerable time. The frequency of administration of the douche is then reduced from twice daily to once daily, and latterly is given two or three times a week. It should, however, be continued for two or three weeks after the complete disappearance of the symptoms.

Besides these local measures general treatment is prescribed. To diminish the pelvic congestion the bowels must be opened freely every day. The diet must be light and nourishing.

When the gonococcal infection has involved the higher regions of the genital tract, the same course of treatment may be tried; the same hope of a successful result, however, cannot be entertained, and to subdue the condition more radical measures may be necessary.

If the cervix and uterus are involved, and it should be noted that such not infrequently happens in a recent case, and even before the appearance of a vaginitis, the surgeon may advise **Curettage**. The diseased mucous membrane is removed, and the walls are swabbed with a strong antiseptic, such as pure phenol.

Where the tubes and ovaries are inflamed an

**abdominal operation** may be necessary for their removal.

Gonorrhœa may be encountered both in the unmarried and in the married. In the case of the latter class the greatest care must be taken by those concerned, to pass no remark to the patient or her friends about the nature and probable origin of the disease. A tactless remark thus uttered may give rise to endless misery and family strife.

## CHAPTER XV

### DISPLACEMENTS OF THE UTERUS

IN this chapter it is proposed to present to the student and nurse a short description of the nature of the most important displacements to which the uterus is subject, and the methods of procedure adopted in their treatment. In a book of this nature the operative methods of procedure can receive only a mention in passing.

**Normal Position of the Uterus.**—To understand the changes in position which the displaced uterus undergoes, the nurse and student must be familiar with the normal lie of the uterus. As described in Chapter I., the uterus in the normal state is tilted from the vertical in such a way that its axis is directed downwards and backwards (see Fig. 2, page 9), and the body of the uterus lies in a forward position in the pelvic cavity. The tilting of the uterus from a vertical line is called version, and the normal uterus is accordingly in a state of **Anteversion**.

Besides this tilting or version of the uterus, we find

that the body and cervix do not lie in the same straight line; they form with one another a curve or angle, with the concavity forwards. This *bending* forwards of the body on the cervix is called flexion, and the normal uterus is in a condition of **Anteflexion**.

The uterus, then, is both anteverted and anteflexed. The uterus being a mobile organ, it has a large range of movement within the normal, and its lie is found to vary in different women, and in the same woman at different times. For example, as the bladder fills it carries the uterus upwards and backwards towards the upright position, whereas with the empty condition of the bladder, the body of the uterus may be directed forwards, in a line with the horizontal.

The normal position of the uterus may be departed from in different ways. The chief uterine displacements are forwards, backwards, and downwards.

**Forward Displacement of the Uterus.**—The chief forward displacement of the uterus, and the only one to receive mention here, consists in an exaggeration of the normal state of forward flexion. The angle between the body and the cervix, instead of being obtuse, becomes transformed into an acute angle. The term given to this displacement is, accordingly, **Exaggerated or Acute Anteflexion**.

This alteration in the uterine curve in the large proportion of cases is *congenital*, when it is usually

associated with a small and narrowed (stenosed) cervix.

To relieve the severe pain at the menstrual periods (dysmenorrhœa) often associated with this condition, and, in the married woman, to increase the chance of child-bearing, the stenosed cervical canal may be stretched by means of dilators (dilatation of the cervix), with or without the performance of an operation, with the object of straightening the canal of the uterus.

Stem pessaries, which were introduced into the uterine canal with the idea of straightening out the flexion, are not to be recommended, because of the danger of sepsis associated with their use.

In some cases acute ante flexion is *acquired*, and is associated with inflammatory thickening and contraction of two ligaments which pass backwards to the sacrum from the posterior surface of the uterus about the level of the junction of the body and cervix (utero-sacral ligaments). As the result of the cicatricial contraction of these ligaments, the cervix is drawn upwards and backwards towards the sacrum, and the body falls forwards and downwards, thus exaggerating the angling of the uterus.

In this case the treatment is directed towards the inflammatory condition responsible for the displacement. A course of plugging and douching (see Chapter VII.) is valuable in promoting absorption of the inflammatory products.

**Backward Displacement of the Uterus.**—This may assume one of two different conditions. In the first place, it may take the form of an alteration in the condition of version. The uterus, instead of being tilted forwards, may be tilted backwards as a whole, the axis of the body and cervix being directed downwards and forwards. This is called **Retroversion**. In the second place, the uterine body, instead of being flexed forwards on the cervix, may be bent backwards, and the uterine curve is altered so that its concavity looks backwards. This displacement is termed **Retroflexion**. The retroflexed uterus is tilted back as a whole, and the condition is in reality a combination of retroflexion and retroversion.

As in the forward displacement already described, displacement backward of the uterus may be congenital or acquired.

The symptoms associated with backward displacement of the uterus vary greatly in their intensity in different patients: some patients complain of few or no symptoms, whilst others are reduced to a state of chronic invalidism.

In the acquired cases where symptoms are present, the patients frequently date the onset of their complaints to the birth of a child, and in a large number of cases to the birth of their last child, for the displaced uterus is less prone to become pregnant than



the normally placed uterus. The chief symptoms are: dull pain in the back, often aggravated by exertion; constipation or irritation of the bowels, due to the pressure of the displaced uterus on the rectum; leucorrhœal discharge, and excessive menstrual flow (menorrhagia), due to the inflammatory condition of the uterine mucous membrane (endometritis) frequently associated with the displacement.

On the bimanual examination the gynæcologist finds the uterus displaced backwards towards the sacrum, and lying in the condition of retroversion or retroflexion.

*Treatment of Backward Displacements.*—The method of procedure adopted in the treatment of backward displacements depends upon whether the uterus is mobile, and can by manipulation be reduced into normal position, or is fixed by adhesions retaining it in its abnormal position. In the former case, the uterus, after reduction, can be maintained in the normal position by means of a pessary; in the latter case, an abdominal operation may be necessary—if other measures fail—to free the uterus from the adhesions. The uterus is replaced, and is at the same time supported in position by one of many operative procedures.

Where the uterus is **mobile**, it may be reduced to the normal position by means of the *Bimanual Method*. In this the body of the uterus is pressed upwards and

forwards by the two fingers of the right hand in the posterior fornix, the left hand on the abdomen at the same time being carried backwards towards the sacral promontory, and downwards behind the uterus, which is thus tilted forwards into the anteverted position.

If this fail, the method in which the *sound* is employed may succeed. With the patient in the dorsal position, and the legs drawn up, the sound is passed; when in position the tip of the sound looks backwards. If the handle of the sound be now swept forwards towards the pubis by describing the curve of a large circle, the end of the sound in the uterus is carried through the half of a small circle, and the point is now directed forwards—the uterine displacement is thus partially reduced. By carrying the handle of the sound backwards, the uterus is tilted forwards into the normal position.

In still other cases the reposition of the uterus may be facilitated by placing the patient in the *genu-pectoral position*. This method is especially employed when the displaced uterus is pregnant (retroversion or retroflexion of the gravid uterus). By means of the fingers in the vagina or rectum, the displaced uterus is gradually pushed forwards. This may be aided by seizing with a volsellum the anterior lip of the cervix, which is pulled downwards and backwards; in this way the body of the uterus is tilted forwards, and at the same time the upper part of the uterus is

brought more within the scope of the fingers in the rectum or vagina.

After the uterus is replaced, it is maintained in the normal position by means of a pessary.

The **pessary** is a mechanical support, devised for the purpose of retaining in position a uterus, which tends to be displaced.

For the treatment of backward displacements, the Hodge and the Albert Smith pessaries are most frequently employed.

*Hodge Pessary.*—This consists of two parallel bars united at the upper end by a curved cross-piece, and at the lower end by a straight portion (Fig. 57). The instrument is made of vulcanite, and can be softened sufficiently to allow of its being moulded to the required shape, after being immersed in water almost boil-



FIG. 57.—Hodge Pessary. ing. When viewed from the side, the instrument is seen to possess a double curve, and looks like an opened-out letter S. The larger upper curve, when the instrument is in position, has its convexity backwards, and is adapted to the curve of the sacrum.

This instrument is especially used to maintain in position a uterus which has been displaced backwards (retroversion, retroflexion), and has now been replaced.

In the introduction of the pessary, the patient is placed in the left lateral posture, and the instrument is held by the lower, straight end, between the index finger and thumb of the right hand. The labia are separated by the index and middle fingers of the left hand, and the instrument is introduced with the transverse diameter directed forwards, *i.e.* in the long diameter of the vulvar orifice, until it is about half within the vagina. The pessary is turned half round, and the index finger of the right hand is pushed up behind, under the upper transverse bar. The instrument is now gently forced along the posterior vaginal wall till the convex upper end rests in the posterior fornix. In this position, if the pessary fit properly, the lower bar of the instrument lies under the symphysis pubis.

*Albert Smith Pessary.*—Here, instead of the two bars of the instrument being parallel, they converge below. The large rounded upper end of the instrument, when *in situ*, occupies the posterior fornix (Fig. 58). This instrument is used for exactly the same purposes, and is introduced in the same way, as the Hodge Pessary.

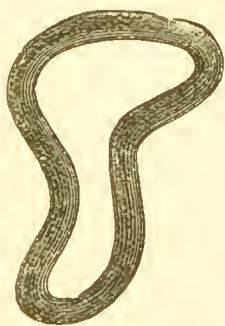


FIG. 58.—Albert Smith Pessary.

In connection with the use of pessaries, some *precautions* must be observed. If the instrument fit properly the patient should

be unaware of its presence. The greatest care must be taken, therefore, to choose a pessary of proper size, and before leaving the waiting-room or consulting-room the patient should be asked to walk up and down once or twice, and she can then usually tell fairly accurately if the instrument will fit. If she should afterwards find that it causes her pain or discomfort, she must have it removed at once.

The patient should be enjoined to douche three times a week, and to report herself to the gynæcologist at least once every month, when the pessary is removed, cleansed, and replaced.

If these precautions are not observed, and the pessary is allowed to remain in the vagina for any length of time without being attended to, it may give rise to serious inflammation of the vagina (vaginitis), and ulceration with offensive discharge. The ulcerated surfaces of the vaginal wall may sprout up round the pessary, and ultimately imbed it, thus rendering its removal extremely difficult. In other cases, the pessary may corrode its way right through into the bladder or rectum, giving rise to abnormal openings (fistulæ) between these structures and the vagina.

When the patient desires more radical treatment than the temporary support afforded by a pessary, or where the pessary fails in keeping the uterus in position, an operation may be performed for the purpose of maintaining the uterus in position. With

this object an operation for the *Shortening of the Round Ligaments* may be performed. These ligaments pass forwards from either side of the uterine fundus to the anterior abdominal wall, which they traverse in the inguinal canal, and are attached at the outer opening of this canal (external ring) in the neighbourhood of the pubic bone. By cutting down over the external ring, the round ligaments may be recognised, and pulled out and fixed in their new position. By this means the uterus is drawn forwards and fixed in the anteverted position (Alexander Adams operation).

In some cases the uterus is **fixed by adhesions** in its abnormal position, and cannot be replaced by any of the above mechanical methods. In this case a course of *plugging and douching* (Chapters VI. and VII.) for two or three weeks may lead to absorption of the adhesions, and the uterus may spontaneously resume its normal position, or it may be replaced as above.

✧ If a course of plugging and douching is insufficient to dispel the adhesions, and the intensity of the patient's symptoms justify it, an abdominal section is carried out to relieve the uterus and permit of its being replaced. When an abdominal operation is necessary, the uterus at the same time is fixed in position by one of several methods, amongst which may be mentioned direct fixation of the anterior surface of the body of the uterus to the anterior



abdominal wall (*Ventral Fixation and Ventral Suspension*), and *Shortening of the Round Ligaments*. In the latter case the round ligaments may be shortened within the abdomen, or they may be carried through the abdominal wall and pulled forwards; they are then stitched in place in such a way that the uterus is kept forwards in the normal position.

**Downward Displacement of the Uterus—Cystocele.**—As described in the chapter on Pelvic Anatomy (Chapter I.), the fundus of the uterus is at the level of the brim of the true pelvis. When the uterus, as a whole, sinks down into the pelvis, and the fundus lies below this level, the uterus is said to be in a condition of **Prolapse**. In many cases the uterus may be prolapsed to such an extent that the cervix, or even the whole uterus covered by the everted vaginal walls, may project through the vulvar orifice (complete prolapse or procidentia).

Prolapse of the uterus in the large proportion of cases occurs in women who have borne children. It is especially found in women who have had a large family, with stretching of the uterine ligaments (broad ligaments, round ligaments, etc.), and relaxation of the pelvic floor by which the uterus is, as it were, slung up. This relaxation of the pelvic floor is often associated with laceration of the perineum.

A patient who is the subject of prolapse of the uterus often solicits advice because of dull *bearing-*



*down pain in the back*, increased by walking, or because of a *leucorrhæal discharge*, or increase in the menstrual flow (*menorrhagia*). The chief complaint, however, is usually of "something coming down." If the uterus project from the vulvar orifice, its presence causes inconvenience, especially if, as frequently occurs, the exposed walls of the vagina which are dragged down over the uterus become ulcerated by the irritation of the clothes.

On *inspection* in a case of prolapse the cervix may be seen projecting from the vulva with the orifice of the cervical canal at its apex, or the vaginal walls everted over the uterine body may be recognised, and the presence of any ulcers, which are often in a foul state, is noted.

With the prolapse of the uterus there is often an associated downward displacement of the bladder, which projects from the vulvar orifice in front of the cervix. This condition is called **Cystocele**.

In other cases a cystocele is found independently of prolapse of the uterus; it in fact often precedes this condition.

In a case of uterine prolapse or cystocele, the displacement is exaggerated by straining-down efforts on the part of the patient.

Where the uterus is displaced downwards, but has not reached the level of the vulvar orifice, *vaginal examination* reveals the low position of the cervix, and the *bimanual examination* often discloses the fact

that besides the downward displacement, there is an associated **Retroversion**.

*Treatment of Downward Displacement.*

If the prolapsed uterus project from the vulvar orifice it is **replaced**. The process of prolapse begins with the anterior vaginal wall, which becomes displaced downwards from below upwards; this is followed by the cervix and then the posterior vaginal wall from above downwards, the uterus meanwhile becoming more and more displaced in a downward direction. In reducing the displacement, the opposite order is observed—the posterior vaginal wall is replaced by being firmly pressed upwards and backwards, the process beginning with the region of the vulvar orifice. After the reduction of the posterior vaginal wall, the uterus is replaced and then the anterior vaginal wall, the process beginning with its attachment to the cervix and ending with the vulvar orifice.

The order of the sequence of events in the production of prolapse may be demonstrated by reducing the displacement and requesting the patient to strain down.

After being replaced, the uterus may be **supported in position** by means of a pessary. For this purpose the ring pessary (Fig. 59) is frequently used to brace up the relaxed vaginal walls, and thus maintain the uterus in position. This instrument consists of a

ring of vulcanite, or of india-rubber with a spring core. The latter form of instrument is the more convenient: it is easily compressed to facilitate introduction, and, by virtue of the spring, maintains its shape when in position.

For its introduction the labia are separated with the fingers of the left hand. The pessary is compressed between the finger and thumb of the right hand, and is easily passed through the vulvar orifice, with the short diameter of the compressed pessary in the antero-posterior direction. It is now turned round, and by means of the right index finger, which is introduced behind, the upper

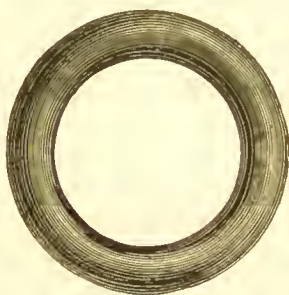


FIG. 59.—Ring Pessary.

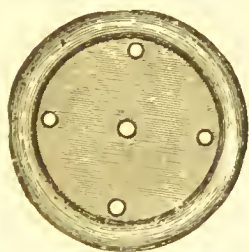


FIG. 60.  
Ring Pessary, with  
Diaphragm.

part of the pessary is carried into the posterior fornix. When in position, the ring embraces the cervix and renders the relaxed vaginal walls taut.

For the treatment of a cystocele a ring pessary with a perforated diaphragm (Fig. 60) is sometimes used. This modification is not recommended, as it tends to dam back vaginal or uterine discharges.

In connection with the use of the ring pessary, the same precautions are observed as have been men-

tioned with regard to the Albert Smith and Hodge pessaries (pp. 161, 162).

From the beginning, or after the ring pessary has been worn for some time, the vaginal walls may be so relaxed that the instrument is insufficient to retain the uterus in position. Under these circumstances

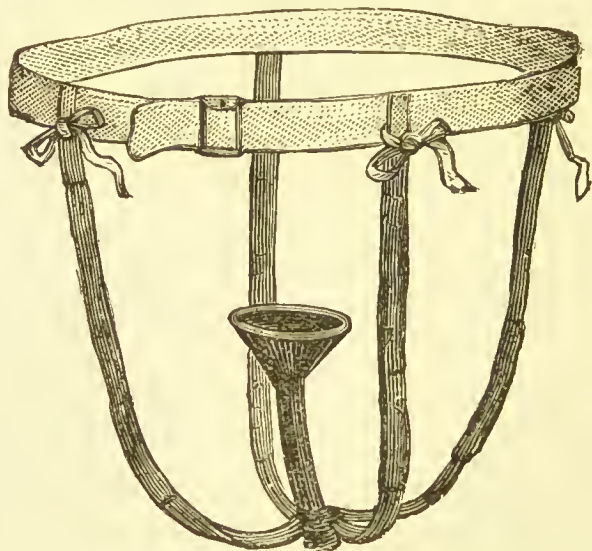


FIG. 61.—Barnes' Cup-and-Stem Pessary, with Abdominal Belt.

the pessary may fall out as the result of a straining effort on the part of the patient.

In these patients, rest in bed and a course of *douching and plugging* for three weeks or so is frequently sufficient to produce contraction of the vaginal walls to such an extent that the pessary is retained and supports the uterus efficiently. This course of treatment is found valuable also where the

prolapsed vaginal walls have become ulcerated and excoriated as the result of the irritation of the clothes. It is employed with special advantage in old women where operative treatment is inadvisable.

Where the ring pessary is not retained even after a course of plugging and douching, and especially in the case of old women, Barnes' cup-and-stem pessary or Napier's pessary may be employed. Barnes' pessary is represented in the figure (Fig. 61); by means of the perineal bands attached to the abdominal belt the pessary is maintained in position.

#### *Operative Treatment.*

This is practised when the patient desires more radical treatment than the temporary support of a pessary, and in those cases where instrumental support fails.

It may take the form of repair of the perineum (perineorrhaphy), with or without an operation for the tightening up of the anterior or posterior vaginal walls (anterior or posterior colporrhaphy). In some cases these three different operations may be necessary in the same patient (see Chapter XVIII.).

In addition to the tightening up of the structures of the pelvic floor, the uterus may be supported from above by the methods already mentioned in connection with the treatment of the backward displacements,

## CHAPTER XVI

### PREPARATION FOR MINOR OPERATIONS

BEFORE a minor operation the patient should, if possible, **rest** in bed for at least one day. The pulse and temperature are charted morning and evening. The urine is carefully examined, and the amount passed in twenty-four hours measured—the normal quantity being about fifty ounces *per diem*. The presence of any abnormal constituents, such as albumen, pus, blood, or sugar is noted, and the surgeon is informed of their existence. The lungs and heart are examined, and the presence of any diseased condition carefully noted.

**Diet.**—The diet must be light and easily digested, and not too liberal in amount. Meat and potatoes are avoided, as they tax the digestive powers and leave a considerable residue. Such articles of diet as thin soup, white fish, milk pudding, an egg, etc., may be quite safely given on the day before the operation.

A cup of weak tea or beef-tea with a small piece of



dry toast may be given three or four hours before the operation.

**Aperient.**—An aperient should be given in the afternoon or early evening of the day before the operation. In all gynæcological work it is of the utmost importance that the bowels be thoroughly moved before the operation. This is especially the case in minor gynæcological operations, where the surgeon is working in the region of the perineum and vagina. In such cases, should the rectum be imperfectly emptied of fæcal matter, the surgeon and nurse may be subjected to the annoyance of the bowels moving during the operation. Should this occur, the field of operation is contaminated with septic material. The sheets and instruments have to be removed, and the parts have to be thoroughly cleansed—the delay thus caused prolongs the operation materially.

It is well, therefore, to ensure that the aperient administered is sufficient to give one or two free movements of the bowel, and that the soap and water enema, which is to be given on the early morning of the day of operation, thoroughly clears the lower bowel. If the enema does not return free of fæcal matter another must be given.

Where the rectum or anus is involved in the operation, as in cases of *complete tear of the perineum* into the rectum, and in *recto-vaginal fistula*, it is



advisable to administer the aperient two nights before the operation ; by the morning of the operation the effects of the purge have passed off completely. If, in such cases, the aperient be given later, the manipulation of the rectum or anus during the operation is apt to reawaken the contractions of the bowel at a higher level, with the result that fæcal matter is carried down to the region of operation. In these cases an enema is given on the morning of the preceding day and, as before, on the morning of the operation day.

A warm, soapy **bath** should be given on the operation morning.

**Preparation of Vulva and Vagina.**—An antiseptic *douche* should be administered on the operation morning. In cases where there is a vaginal discharge, the *douche* should be given night and morning for several days before the operation.

Before every gynæcological operation, the *external genitals must be shaved*. This is best done on the evening preceding the operation day. If the patient is weak or of a nervous temperament, the shaving may be postponed till she is under the anæsthetic.

For the shaving the nurse will require a firm pillow, a mackintosh, two towels, a basin of weak lysol with a piece of white soap, several small pledgets of cotton wool, and a razor. The razor should be sharp ; the skin is more apt to be cut in

the jerky motion of a blunt razor than during the smooth movement of the sharp razor.

Everything being in readiness, the bedclothes, with the exception of the covering sheet, are turned down to the foot of the bed, and the nightgown is rolled up all round to the level of the waist. The legs are flexed and the firm pillow is slipped under the small of the back, and covered by the mackintosh, over which a towel is placed. By raising the pelvis off the bed by means of the pillow, which should not project beyond the buttocks, better access to the labia and perineum for purposes of shaving is obtained.

The covering sheet is now drawn up in the centre till the vulva is exposed, as described in the method for the examination of the external genitals (Plate I.).

By means of the soap and the warm lysol solution a thick lather is obtained, and the parts are carefully shaved. In shaving, the edge of the razor must be kept at only a small angle to the skin surface; the risk of scratching or cutting the skin is thus diminished.

When the hair has been shaved from the labia and perineum, the pillow is removed and the legs are straightened, when the pubis can be shaved.

In some cases the hair will be found to extend beyond the perineum and round the anus; under these circumstances the easiest access is obtained by placing the patient, after the other parts have been

shaved, in the left lateral position, with the knees drawn up.

When the shaving is completed the parts are washed with the wool and lysol, and then dried with the towel.

To a nurse of experience the operation of shaving can be accomplished easily in two or three minutes.

**Instruments, Swabs, etc.**—The instruments necessary for the operation are sterilised by boiling for five or ten minutes in a soda solution, as described in Chapter IV., and are, just before the operation, transferred by the nurse or assistant, who has previously cleansed the hands, to a flat dish containing sterile water.

In general it may be stated that at least two dozen small swabs and three or four towels should be sterilised for use by being subjected to the germicidal influence of steam, as described in Chapter IV.

A plentiful supply of hot and cold sterilised water should be at hand, and also carbolic lotion (1-80) or corrosive lotion (1-1000), and a weak solution of lysol (1-100). When a douche is to be administered the requisite lotion must be in readiness.

In preparation for the operation the patient should be clad in a nightgown and a warm flannel jacket. A pair of white woollen stockings, long enough to reach half-way up the thighs, should be worn.

The hair is divided at the back of the head and

arranged in a plait on each side—hairpins should be avoided as, during any sudden movement, the patient may thereby be injured. For the same reason earrings, if present, are removed. Just before the administration of the anæsthetic the patient is requested to empty the bladder, and the external genitals and perineum are sponged carefully. If she be unable to empty the bladder, which may be due to nervous excitement, the catheter must be passed. If artificial teeth are present, they are removed to prevent any trouble during the administration of the anæsthetic. The hair is now covered with a linen cap (see page 103), and the patient is ready for the anæsthetic.

When possible, the patient should be anæsthetised whilst in bed; this is especially important in a weak or nervous woman. In such a woman the nervous excitement already present is increased tenfold by even the slight exertion entailed in stepping or being lifted on to the operating table. The risks encountered during the administration of an anæsthetic, such as fainting, arrest of breathing, etc., are, we believe, increased by mental excitement, and it should be the duty of the nurse to avoid anything likely to exaggerate that excitement.

**Preparation on the Operating Table.**—When under the influence of the anæsthetic the patient is lifted on to the operating table, and taken to the operating room. If the table is not movable the patient is

carried to the operating room on a trolley or stretcher.

If, as is usually the case, the operation is to be performed in the Lithotomy position, the gown is rolled up and the patient is lifted to the end of the table, on which a Kelly's pad, or a mackintosh covered with a towel, has been previously placed.

The *Kelly pad* consists of a horseshoe-shaped rubber cushion, which is inflated with air to the

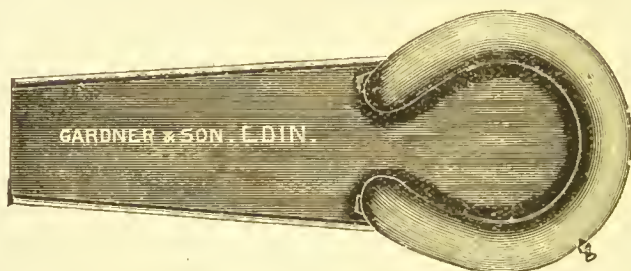


FIG. 62.—Kelly Rubber Pad.

required extent; attached to it is a rubber flap, which is draped into the pail or basin placed under the table (see Fig. 62). The buttocks of the patient are placed on the cushion, which catches any lotion that might spread backwards and wet the sheet and clothes. By means of the flap of the pad or the mackintosh, as the case may be, the lotion and blood are carried into the pail or basin placed beneath.

The buttocks of the patient should project slightly beyond the table, and the legs are

elevated and fixed to the uprights fitted to the end of the table (see Fig. 63).

The vulva and adjacent skin surfaces are thoroughly

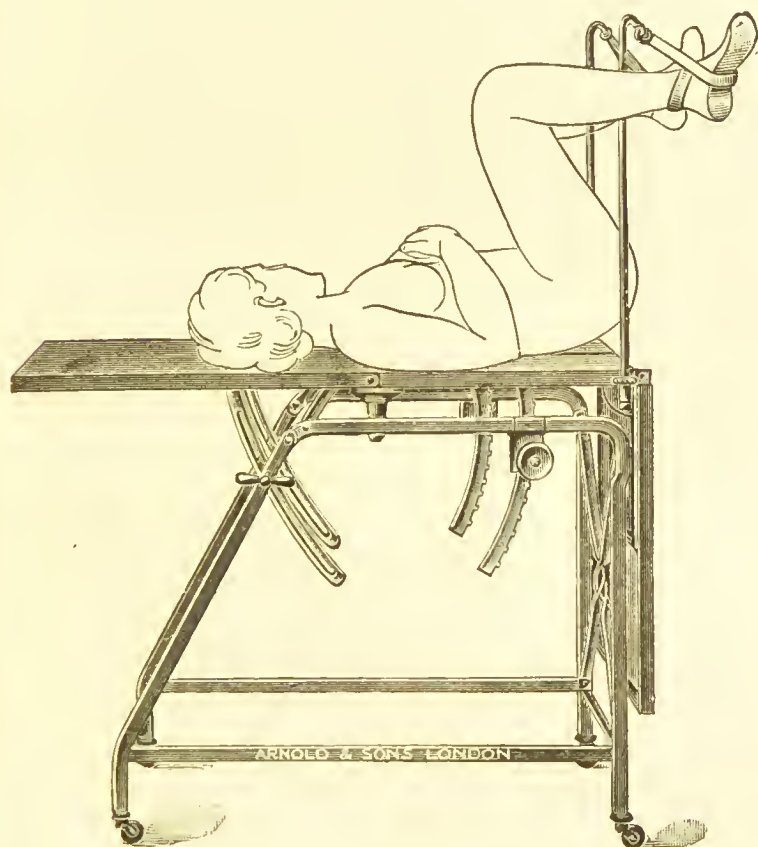


FIG. 63.—Lithotomy Position, showing how Legs are fixed to Uprights.

washed with lysol lotion (1-100), or with a solution of green turpentine soap followed by corrosive lotion (1-1000). The vagina is likewise swabbed out with the antiseptic lotion, and the vulva and surrounding



skin are dried with a sterile towel. The sterile covering stockings (see page 305) are now slipped over the legs and rests, and the large covering sheet provided with two holes for the legs and an opening corresponding to the external genitals, is now put on (see Plate II.). A small folded towel is laid on the vulva till the operation is commenced.

If, as in a private house, the operating table is not provided with leg rests, a Clover's crutch (Fig. 64)



FIG. 64.—Clover's Lithotomy Crutch.

may be employed. This, as seen in the figure, consists of two bands to encircle the legs, which can be separated to the required extent by means of the sliding rod indicated. The thighs are flexed on the abdomen and are retained in position by means of the leather belt, which is passed under one axilla, round behind the neck, and over the opposite shoulder.





Preparation of Patient for Operation in Lithotomy Position.



In other cases the limbs may be supported by two assistants in the following way. Each thigh is fully flexed on the abdomen, and the knee, which is held tightly in the axilla of the assistant, is flexed so that the heel of the foot almost touches the back of the thigh. By leaning well back the assistant can keep the legs out of the way of the operator; the two hands are left free for the purpose of holding volsella, forceps, etc., or for passing swabs.

Where Kelly's rubber pad is employed it should, after each operation, be thoroughly cleansed by scrubbing with soap and water. Any discoloration may easily be removed by sponging with a saturated solution of oxalic acid (salts of sorrel) in water. If the apron has been infected with pus, etc., it should be cleaned with swabs of cotton wool soaked in corrosive lotion (1-1000), and then hung up to dry, or it may be boiled for a few minutes in plain water.

## CHAPTER XVII

### CURETTAGE OR CURETTING

THIS is probably the commonest operation in gynæcology, but though simple in its nature and of everyday occurrence, it entails no small responsibility on the part of the operator and assistants.

Sepsis, following such an operation, is a fruitful source of mischief in the ovaries and Fallopian tubes, and may even endanger life.

Curettage is performed to relieve excessive discharge of blood at the menstrual period in the disease known as **endometritis**, where an inflamed mucous membrane lines the uterus; to remove pieces of membrane, etc., that have been retained after an **incomplete abortion** has taken place; and sometimes also to stimulate the contraction of the uterus when small **fibroid tumours** exist there causing hæmorrhage. It is also performed in cases of suspected **malignant disease**, to procure a specimen of the uterine "scrapings" for microscopic examination.

In the operation, the mucous membrane of the uterus is removed, and, accordingly, a raw surface left; the introduction of septic organisms may give rise to serious mischief. To prevent this, the patient should be prepared by douching the vagina twice daily with an antiseptic lotion for two days before she is operated upon.

The patient's bowels should be made to move thoroughly by giving her castor oil the day before, and an enema on the morning of the operation. In addition, she is instructed to empty her bladder just before being removed to the operating room.

The same preparation for the administration of the anæsthetic is adhered to, and the clothing of the patient is the same as that described in the previous chapter. The Lithotomy posture is also generally assumed, and a Kelly's apron used to protect the sheets and the clothing of the patient.

For this operation the following **instruments** are required:—Vaginal speculum, either Sims' or Auvard's self-retaining speculum; two volsella; cervical dilators, including the series of graduated metal dilators and the Sims' dilator; two uterine sounds, or, where the uterine forceps is employed for applying medicament to the uterine walls after the operation, only one sound; curettes. All these instruments are described and figured in Chapter II. Where the operation is performed to remove undetached fragments of placental tissue and membranes, in a case of incomplete abor-

tion, the cervical canal may be already dilated sufficiently to admit the curette. In this case, also, the flushing curette may be employed.

All instruments to be used are boiled, and then laid out in a tray containing carbolic lotion (1-80), or sterile water, in a quantity sufficient to cover them.

After investigating the size and position of the uterus by means of the sound, the surgeon uses the metal dilators to dilate the cervix before the uterus can be entered by the curette or scraper.

In ordinary practice the cervix is dilated partially by means of the graduated dilators, and the dilatation is completed more rapidly by means of the Sims' dilator.

The graduated dilators have their numbers stamped upon them, the smallest used in an ordinary case being No. 8, and the largest No. 18. It is a good plan to arrange these instruments in order before the operation begins, so that the operator can quickly pick up and introduce one after another without stopping to choose the proper size.

The Fritsch's double catheter is sometimes used, especially in the cases of incomplete abortion where the bleeding may be excessive, to wash out the uterus with hot antiseptic lotion after the scraping is over.

In this operation also the "dressed" sound may be used, and should be got ready beforehand. In this case two sounds are required; one to swab out the

uterine cavity, and the other to apply the required caustic to the raw surface. The sound is dressed thus:—A very thin layer of cotton wool is laid flat upon the palm of the left hand. The uterine sound, previously boiled, is then dipped in an antiseptic lotion in order to make the wool adhere firmly to it. Holding the sound in the right hand, the film of wool is then wound round it, beginning at the tip of the instrument, which is then rapidly and firmly twisted round and round, the left hand being firmly closed over the point of the instrument until it is covered with a hard layer of sufficient thickness to increase the calibre of the sound to that of a No. 9 or 10 dilator.

The caustic most commonly used is pure carbolic acid (phenol), and a bottle of this should be at hand into which the dressed sound can be dipped when it is asked for. When handing the sound to the operator the assistant also presents a small piece of dry sterile wool, which is packed into the vagina behind the cervix, to prevent the acid from injuring the vaginal wall, when it returns in excess from the cervical canal. Instead of pure carbolic some surgeons prefer iodised phenol, which consists of a saturated solution of carbolic acid in tincture of iodine.

The operator may then ask for iodoform gauze with which to pack the uterine cavity, and the piece used for this purpose should not be more than 1 inch in breadth when folded, and should be cut



beforehand to avoid unnecessary handling and delay. Broader strips of iodoform gauze may be used to pack the vagina, after which the nurse will thoroughly dry the patient's buttocks and back before allowing her to be removed to bed.

The **after-treatment** is simple, and consists of removing the vaginal and uterine plugs of gauze, where such were used, and keeping the vaginal canal clean by antiseptic douching.

The plug is left in the uterus for a length of time varying from twenty-four to thirty-six hours, after which the patient will often begin to complain of colicky pains in the lower part of the abdomen—due to the efforts of the uterus to expel the plug. That in the vagina is removed first, then that in the uterus. A vaginal douche of lysol (1-100) is then given, and repeated daily for a week.

As already described, everything used for such a douche must be perfectly aseptic, and the vulva should previously be cleansed by swabs of wool soaked in an antiseptic lotion.

Very little bloody discharge should be present after curettage. If it be excessive, the nurse should inform the surgeon.

At the end of the week the patient may be allowed out of bed, but should not attempt to walk for another two or three days.

## CHAPTER XVIII

### REPAIR OF THE PERINEUM, OR PERINEORRAPHY— PREPARATION AND AFTER-TREATMENT

THE operation for the repair of the perineum which has been torn or unduly stretched during the birth of a child is frequently witnessed in gynæcological practice. By this means the defective pelvic floor is braced up, and the dragging sensation of which the patient complains, with perhaps a tendency to prolapse of the anterior vaginal wall and bladder (cystocele), or posterior vaginal wall, or even of the womb itself (prolapsus uteri) is removed. In addition to the operation for the deficient perineum the surgeon frequently finds it necessary to perform an operation to tighten up the anterior vaginal wall (anterior colporrhaphy), or of the posterior vaginal wall (posterior colporrhaphy).

The success of these procedures depends to a large extent upon the preparation before, and the treatment after, the operation.

From their close proximity to the anus, the

perineum and the relaxed lower part of the vagina are difficult to cleanse thoroughly. Imperfect results can often be traced to sepsis, and accordingly the most stringent attention must be paid to the preparatory and after-treatment.

A **douche** should be administered twice daily for several days before the operation with an antiseptic lotion, and if there be an excessive discharge the vagina should be packed loosely every night with iodoform gauze, which is removed before the morning douche.

**Aperient.**—The greatest care should be exercised with regard to the bowels to prevent their movement during the operation. An aperient is given on the afternoon before, and a large soap and water enema on the morning of, the operation. If, however, the tear of the perineum be complete, that is, extending into the rectum, the purge should be given two nights before the operation. If given on the preceding day the manipulations of the surgeon in the region of the anus are apt to re-excite the contractions of the bowel. In such cases, also, the nurse will find that, whilst on the back, the patient is unable to retain the enema because of the involvement of the sphincter ani. In the genu-pectoral position, however, a large enema can usually be retained. In the case of a complete tear of the perineum an enema is given on the day preceding, and on the early morning of,

the operation. The latter, if necessary, must be repeated until the bowel is completely emptied.

The **instruments** necessary for the operation of perineorrhaphy are as follows:—Scalpel; dissecting-forceps; four or five artery forceps; scissors with sharp points, and preferably with angled blades; needles and needle-holder. In addition to these the required suture material, catgut or silkworm-gut, must be at hand. If the anterior vaginal wall is to be braced up by the operation of anterior colporrhaphy, the vaginal speculum of Auvard or Sims is required to hold back the posterior vaginal wall, and the bladder sound (Fig. 44, page 118) will perhaps be necessary for the purpose of passing into the bladder to demonstrate the position of this organ during the operation; the risk of its being injured is thus minimised.

If, as frequently happens, the uterus is enlarged, the operation of curettage may be performed, and for this the requisite instruments, as described in the previous chapter, are prepared.

The further details of the preparation for the operation are described fully in Chapter XVI.

**After-treatment.**—After the completion of the operation the wound is gently swabbed with wool soaked in sterile water, and the skin of the perineum and hips is cleansed of all blood stains, and dried with a sterile towel.

The wound is dressed with a piece of sterilised iodoform gauze, over which is placed a pad of sterile wool. The dressing may be held in position by means of a T-bandage. This, however, is unnecessary, as in bed the legs are bound together to prevent the possibility of the perineal region being put on the stretch.

A towel is the best means by which to keep the limbs together, and it should extend from about 4 ins. above the ankle to about 3 ins. above the knee. It should be fastened, not too tightly, by means of safety pins introduced parallel to the edge. A towel applied in this way is much more comfortable than a bandage round the knees. A small pad of wool should be placed between the knees to prevent the discomfort caused by the pressure of the bony prominences against one another.

A patient need not be kept lying constantly on the back, though this is the most desirable position when possible. She may be eased from time to time by being gently turned on her side by the nurse. She must on no account be allowed to turn of her own accord; for by so doing the stitches may give way and the wound may gape.

The *catheter* should not be passed if the patient can micturate naturally. After passing water, and after each motion, the parts should be sponged with a weak antiseptic lotion, and dried very gently with

sterile gauze ; on these occasions the iodoform and wool dressing is changed.

If there is retention of urine, the catheter is passed every twelve hours with the strictest observance of asepsis, and the utmost care is taken to avoid injuring the wound in the process.

The *bowels* are kept at rest for two whole days. On the evening of the third or the early morning of the fourth day an aperient or an enema is administered. If, however, the perineum has been torn into the rectum, the surgeon may wish the bowels to be kept at rest for eight or ten days (Kelly), in which case the diet must be restricted to liquids with a minimum residue, such as chicken or beef tea, and albumen water.

The albumen water is made by switching the white of an egg, to which is added some crushed ice, the juice of a lemon, and 3 ozs. of water. A convenient and satisfactory diet consists of 2 drs. of this given every two hours, gradually increased to 2 ozs. every two or three hours, alternating this from the fifth day onwards with small quantities of chicken or beef tea.

Milk should be avoided where the bowels are kept quiet for any length of time ; from it a considerable residue is left, as is seen in the treatment of Bright's disease, where the diet is often limited to milk.

In these cases an aperient, usually castor oil, is given after eight or ten days. It is with great advantage preceded by an enema of 4 to 6 ozs. of

warm olive oil; this being small in amount and non-irritating in nature, can easily be retained by the patient till the aperient begins to act, and has the effect of softening the fæcal matter in the lower bowel, which, at the end of eight or ten days, is frequently so hard as to cause injury in its passage. By this means the bowels are moved with comparative ease to the patient, and the risk of undue pressure with tension on the stitches is thus avoided.

Douching should be avoided after the operation of perineal repair, unless there is much vaginal discharge, or unless the period should come on. It not infrequently happens after a gynæcological operation that menstruation occurs a week or ten days too soon. Under such circumstances it is well to keep the parts clean by giving a daily warm antiseptic douche—the temperature not exceeding 105° Fahr.



## CHAPTER XIX

### THE OPERATION OF VESICO - VAGINAL FISTULA REPAIR—PREPARATION AND AFTER-TREATMENT

THERE are few gynæcological conditions requiring more careful treatment than is necessary before and after the operation for vesico-vaginal fistula, in which there exists a communication between the bladder and the vagina. To close the opening an operation is undertaken from the vaginal aspect.

**Care of the Skin, Vagina, and Bladder.**—These patients come to the gynæcological wards with a history of having been unable to retain any urine for weeks or even months. The urine, as it enters the bladder from the kidneys, continually escapes through the abnormal opening, and trickling over the mucous membrane of the vagina and skin of the external genitals and sides of the thighs gives rise to an extensive irritative inflammation of these parts. This state of affairs is more marked still if, as frequently occurs, there is a superadded septic inflammation of the bladder with foul urine.

All cases are not so severe as that just described; but many, unfortunately, have reached this miserable stage before proper advice is sought.

It is well-nigh useless to operate until the parts are all in a clean and healthy condition, and it will be the nurse's duty to exercise all her skill in bringing this about with as little delay as possible. To do so requires much perseverance.

From what has been said above, it will be understood that the three structures to be carefully attended to are the skin surfaces, the mucous membrane of the vagina, and the mucous membrane of the bladder.

The skin surface should be gently mopped with swabs made of cotton wool soaked in boracic lotion, until all foreign matter has been removed, after which it is gently dried by means of a soft gauze swab.

To promote the healing of any areas of ulceration or excoriation, a weak solution of nitrate of silver (grs. v- $\bar{z}$ i of distilled water) is carefully applied over the raw surfaces. After this an antiseptic oil, such as eucalyptus oil (20 per cent.) in olive oil, is now smeared over the dry, clean surface of the skin.

In the worst cases of skin affection, much comfort will be given to the patient by the insertion of pieces of soft lint, moistened with the oil just mentioned, between the cleft of the buttocks and the thighs, thus preventing the inflamed skin surfaces from rubbing against one another.

As with the skin surface, so with the mucous membrane of the vagina. A slight amount of friction is necessary to ensure the removal of all septic matter, urine salts, etc., so the walls are first cleansed by swabs introduced by a pair of dressing forceps and gently twisted round. An antiseptic vaginal douche is then given to complete the cleansing. Excoriations are treated with silver nitrate in the same way as the skin surfaces. The douche must in all cases precede this application; should it follow it, the caustic substance will be almost entirely washed away.

The bladder must be washed out with warm boracic lotion in the manner already described (*vide* Chapter XII.), the nurse bearing in mind that the greater part of the water injected will escape into the vagina. As the result of this treatment, the urine will soon regain its normal state.

The cleansing of the skin, the vagina, and the washing-out of the bladder, should be done twice daily—morning and night. If the excoriated surfaces in the vagina and on the skin are tardy in healing, the application of the silver nitrate solution may be repeated after three or four days.

A definite system is necessary in this preparatory treatment, and the proper way of carrying it out is to begin with the cleansing of the bladder, and end with that of the skin on each occasion.

A rapid improvement in the patient's condition

will follow, and within a fortnight the operation may be undertaken with a fair prospect of success.

**Instruments.**—For the operation the following instruments and materials are necessary :—Auvard's speculum (Fig. 4, page 17), forceps with toothed ends for seizing the edges (Fig. 65), fistula knives (Figs. 66 and 67), for paring the edges of the fistula, scissors, fistula needle (Fig. 68), and the suture material desired—usually fine catgut.

The regulation of the bowels, the preparation of the instruments to be used, the arrangement of the operating table, and the clothing of the patient immediately before operation, are in every way similar to that described in the chapter on the Preparation for Minor Operations.

Before beginning, the operator may ask for a solution whereby to ascertain the exact position of the fistula.

This, of course, will be required only in cases where it is very small and not easily seen among the folds of vaginal mucous membrane. The liquid generally required for this purpose, and which should always be in readiness, consists of equal parts of sterilised milk and sterilised water. This is heated to a temperature of 100° Fahr. and handed to the operator, who will by means of a catheter, fitted to a Higginson's syringe with a fine-pointed nozzle, inject several ounces into the bladder. The white

liquid now trickles into the vagina through the fistula, and determines at once the exact position



FIG. 65.—Vaginal Fistula Forceps.



FIG. 66.—Vaginal Fistula Knife—angled.



FIG. 67.—Vaginal Fistula Knife—straight.



FIG. 68.—Vaginal Fistula Needle.

of the opening, the edges of which, after being rawed by the fistula knife, are brought into apposition by means of a series of sutures.

After the operation has been completed, and the patient put back to bed with a small iodoform gauze plug in the vagina, the first and most important part of the after-treatment consists in the **drainage of the bladder**, which must be kept empty and at rest, so as to avoid all strain on the stitches used in the repair of the fistula.

A catheter is used for the purpose, preferably the soft rubber "winged" catheter (see Fig. 69). The term "winged" has been given from the presence of two small rubber projections, one on



FIG. 69.—Self-retaining "Winged" Catheter.

each side of the instrument, at a distance of about half an inch from the end which is to be inserted.

The object of these wings is to prevent the catheter from slipping out, which might easily happen during the movements of a restless patient.

The wings are folded back against the sides of the catheter, which is then introduced until they have disappeared from view in the urethra, whose walls maintain the folded position of the wings, until the bladder is reached, when, by their own elasticity they spread out and come in contact with the neck of the bladder, and thus the retention of the catheter is ensured.

A better form of winged catheter is represented in Fig. 70. By stretching the instrument over a large probe the wing projections are flattened out

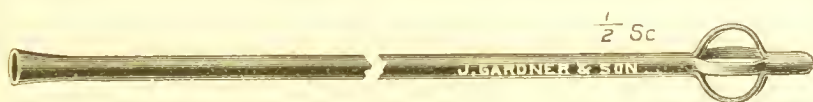


FIG. 70.—Winged Catheter—better pattern.

and the introduction is rendered easier and less painful. There is no risk of the wings becoming detached in the bladder in this form of catheter.

Urine will begin to trickle through the catheter immediately on its introduction, and a convenient vessel must be placed to receive it.

A small slipper-pan may answer this purpose. The appliance shown in Fig. 71, which was made



FIG. 71.—Urine Pan for Fistula Case.

by Messrs Gardner & Son from a design furnished by one of the authors, has been found useful in the after-treatment of these cases. In shape it is more or less like a slipper-pan. It has a broad, flat base, and the top, which is pierced by two holes, is constructed to allow the patient's thighs to lie close to



it. The opening at the toe or narrower end receives the catheter, and to that at the heel or broader end is fitted a tubular handle; this also provides a convenient means of emptying the vessel. Part of the top can be removed like a lid, and the interior may thus be easily and thoroughly cleansed.

As the pan rests on a broad base, it is impossible for it to be overturned; there is therefore no risk of the sheets becoming wet. At the same time, from the arched shape of its roof, it can lie between the thighs without causing any inconvenience, especially if covered with a layer of cotton wool, upon which the limbs of the patient may rest.

Twenty-four hours after operation, or sooner, if blood is being passed through the catheter, the bladder should be washed out with warm boracic lotion, care being taken that not more than 3 ozs. of lotion (*i.e.*, two compressions of the ball of an ordinary Higginson's syringe) is injected at a time. After the washing-out is completed, the catheter should be removed and a fresh one introduced.

The catheter on its removal should be thoroughly washed, and its channel cleansed by a syringe, thereby removing the mucus and the phosphatic deposit, which soon accumulates in a catheter left in the bladder. After boiling, it is put away in a jar of boracic lotion, and is ready again for use next day to replace the other, which, after its extraction, must be treated with similar care.

The packing of gauze in the vagina should be slowly and gently withdrawn at the end of twenty-four hours.

The catheter should be changed once every day, and the vessel for receiving the urine should be emptied and thoroughly cleansed two or three times a day.

As a rule, drainage of the bladder is continued for a week or ten days, after which the catheter is permanently removed. Even at this stage, however, it is unwise to allow the bladder to become distended, and thereby exert undue tension on the stitches, and the patient must, therefore, pass urine every three or four hours for another week at least.

It sometimes happens that the patient is unable to do so at first, and in such a case the urine should be drawn off every four hours until she regains the power of passing it, which has been lost owing to the temporary disuse into which the bladder has fallen.

The stitches, unless catgut has been employed, are usually removed at the end of a period of from ten to twelve days.

The result of the operation, which is often a most difficult and complicated one, depends very greatly on the way in which the after-treatment is carried out; no care or trouble should be spared to bring about a successful issue, and thus free a woman from the terrible discomforts and misery of a vesico-vaginal fistula.

## CHAPTER XX

### VAGINAL HYSTERECTOMY

IT is convenient at this point to consider the operation of vaginal hysterectomy (removal of the uterus through the vagina). Like the operations described in the preceding pages, it is performed by the vaginal route. Unlike them, however, it is classed amongst the major operative procedures of gynæcology.

The operation of vaginal hysterectomy is performed in some cases of **fibroid tumour** of the uterus to relieve the patient of the severe hæmorrhage often associated with these growths, either in the form of excessive menstrual discharge (menorrhagia), or of a loss of blood between the periods (metrorrhagia); it is also carried out to free the patient from the symptoms caused by the pressure of the tumour on neighbouring structures—pain, retention of urine due to pressure on the urethra, severe constipation due to pressure on the rectum, etc.

Its employment in a case of fibroid tumour is only possible whilst the growth is still comparatively

small. If the fibroid is too large to be removed entire, its removal by this route may be rendered possible by splitting the uterus with the tumour and removing it in two or more pieces.

In the majority of cases this operation is practised for the removal of a uterus the seat of **malignant disease**, either of the body or of the cervix. The most common type of malignant disease encountered in the uterus is carcinoma, and the most frequent site by far is the cervix.

A patient suffering from cancer of the cervix usually seeks advice because of the copious, fetid discharge associated with this disease, or because of the repeated hæmorrhages from the ulcerated surface. In the earlier stages the loss of blood may be manifested by an increased flow at the menstrual periods ; as the disease advances, however, the hæmorrhage becomes continuous.

Cancer of the cervix is especially found in middle-aged and elderly women, and with very rare exceptions only in women who have borne children. It frequently develops after the time of the normal cessation of menstruation (menopause), and in such cases its presence is often first suggested by the re-appearance of a blood-stained discharge. Such a condition of affairs should immediately arouse suspicion, for, *in the great majority of cases, hæmorrhage from the vagina which appears after the menopause is due to malignant disease of the uterus,*

In a large proportion of cases of malignant disease of the uterus, and more especially of cancer of the cervix, the condition is found on examination to have spread beyond the scope of feasible removal; this lamentable state of affairs is due in the main to the fact that pain is often a most insignificant symptom. As long as the disease is limited to the cervix there is an entire absence of pain, and the onset of this symptom in a large proportion of the cases only arouses suspicion when the disease has spread beyond the hope of removal.

In vaginal hysterectomy the uterus is freed from its attachments, and is drawn through the vagina and delivered at the vulvar orifice.

During the freeing of the uterus the peritoneum is incised, and at the end of the operation there is left a free communication between the peritoneal cavity and the vagina. Any infection of the field of operation can therefore readily spread upwards and induce a septic peritonitis.

**Preparation.**—For these reasons the greatest care must be exercised in the preparation of the patient. This is especially the case in cancer of the cervix, where the septic element usually associated with the cancerous ulceration must be strenuously combated by means of a course of *antiseptic douching* extending over several days.

Each day the patient should have a warm bath,

and an antiseptic douche of lysol (1-100) should be administered morning and evening. After each douche the vagina should be plugged loosely with iodoform gauze. Where hæmorrhage is severe a tighter plug, sufficient to control the bleeding, is necessary.

On the morning of the day before the operation an *aperient* is administered, and on the following morning a large soap and water enema, repeated if necessary, is given. On the night before the operation the genitals are shaved, as for other vaginal operations.

In vaginal hysterectomy the uterus is drawn down by means of volsella attached to the cervix, and freed from its attachments, after which it is extracted through the vaginal orifice. The chief attachments which require division are the vaginal roof which suspends the cervix, the peritoneum in front of and behind the uterus, and the peritoneal folds or broad ligaments, which extend from each side of the uterus and sling it to the pelvic walls. At their upper free edge these folds contain the Fallopian tube and the ovarian vessels, and at their base the uterine vessels course forwards and inwards to reach the uterus.

Before the uterus can be removed, therefore, the broad ligaments with their vessels must be firmly grasped, to prevent the possibility of hæmorrhage.

For this purpose either a series of ligatures may be used, by means of which the different levels of the

broad ligaments are secured in succession, or clamps sufficiently long to include the whole depth of the broad ligaments in their grasp may be employed.

As can easily be understood, the clamp method of performing vaginal hysterectomy is much more rapid than the method by ligature. The broad ligament on each side is seized by, and divided between, two clamps, the inner of which grasps the uterine ends of the divided vessels, and is removed with the uterus. This method, however, is open to the objection that the tissues in the grasp of the clamps are killed and slough off. This process retards the healing of the wound, and the convalescence is accordingly prolonged.

For the operation five or six dozen small gauze swabs should be sterilised.

The following *instruments* are required :—Sims' or Auvard's speculum; two ordinary volsella; two or three



FIG. 72.—Doyen's Volsellum.

larger and stronger volsella of the type represented in Fig. 72, for the purpose of seizing the uterus at successively higher levels and drawing it down as



it is gradually freed ; two vaginal retractors (Fig. 73) ; bladder sound (Fig. 44, page 118), to indicate the position of the bladder, which at an early stage of the

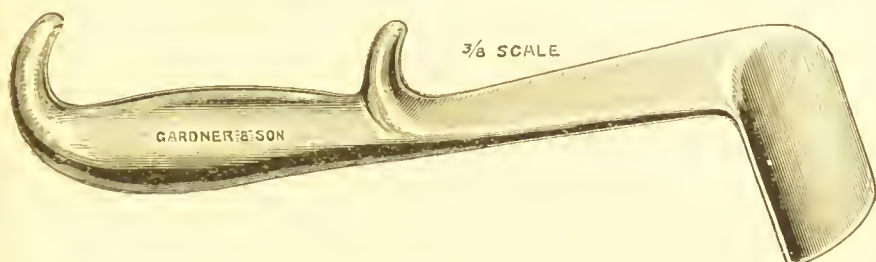


FIG. 73.—Vaginal Retractor.

operation must be freed from the cervix ; scalpel, and scissors. Six or eight artery forceps should also be laid out.

Where the broad ligaments are to be secured by means of ligatures, the pedicle needle or pedicle forceps (Fig. 26, page 32) with ligature material (catgut, silk) should be at hand. If the gaping wound left at the end of the operation is to be partially closed, one or two needles with suture material will be required.

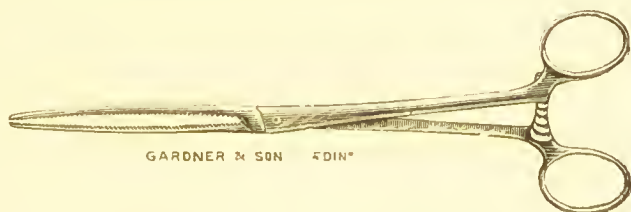


FIG. 74.—Broad Ligament Clamp.

Where the clamp method is to be employed, four pairs of clamps (Fig. 74), two large and two small, will be sterilised.

In the case of cancer of the cervix, if he has not already done so at a preliminary operation a few days before, the surgeon will probably scrape away the ulcerated and infective surface and apply caustic to the raw area left. The vagina is then thoroughly cleansed. By adopting this precaution, the risk of the operation area becoming contaminated with the septic and cancerous material is diminished. When this is to be done, the instruments used for curettage must be in readiness.

In some cases, also, before beginning the operation, the surgeon may desire to pass bougies into the ureters for the purpose of ensuring their easy recognition, and diminishing the risk of their being injured during the operation. When this is desired, the instruments used in the investigation of the bladder by Kelly's method will be necessary, with in addition the long, slender ureteral bougies. These are left projecting from the urethra, and are easily removed at the end of the operation.

Four hours before the operation a douche of corrosive sublimate (1-2000) should be given, followed by another half an hour before the patient is taken to the operating room.

To prevent the risk of chill whilst under the anæsthetic, the patient should be warmly clad. A convenient and satisfactory attire is a flannel gown, over which is placed a flannel jacket buttoning at the back of the neck, and easily removed when the patient

is back in bed. The usual long white woollen stockings should also be worn.

When under the anæsthetic, the patient is placed on the operating table in the lithotomy posture, and is prepared exactly as described in the chapter on the Preparation for Minor Operations.

**After-treatment.**—At the end of the operation a length of sterilised iodoform gauze will in all probability be introduced into the vagina to exercise gentle pressure and arrest any oozing of blood, and at the same time act as a drain. This is removed by the surgeon after a few days.

If clamps are employed, their handles are left projecting from the vaginal orifices, and are surrounded by a pad of sterile wool. In moving the patient, the greatest care must be taken not to interfere with them, as severe hæmorrhage may supervene if they slip their attachments. The clamps are usually removed forty-eight hours after the operation.

To prevent the patient from straining, the urine should be drawn off every eight hours for the first two or three days. This is imperative in the cases where clamps are used, and in introducing the catheter great care must be taken to avoid moving them.

## CHAPTER XXI

### PREPARATION FOR ABDOMINAL SECTION

**Instruments, etc., for Abdominal Section.**—For an abdominal operation the following *instruments* are sterilised :—Scalpels ; dissecting forceps ; scissors (blunt - pointed and sharp - pointed, straight and curved) ; artery forceps, at least two dozen ; two small retractors for the abdominal wall ; one large and two small abdominal retractors ; four pairs of

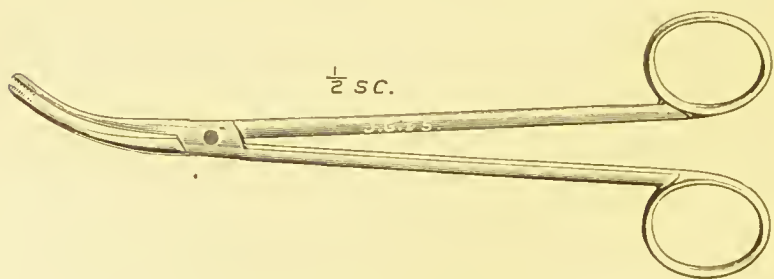


FIG. 75.—Pedicle Needle-forceps.

clamp forceps for broad ligaments or intestine if necessary (Fig. 74, page 205) ; pedicle needle or pedicle forceps (Fig. 75) ; three or four sponge-

holders or long forceps to hold gauze swabs ; needles—including those for skin, intestine, and those for holding the large and small sizes of catgut ; needle-

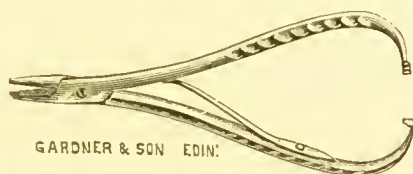


FIG. 76.—Needle-holder.

holder (Fig. 76). In addition there will be required suture material and ligatures (see Chapter XXVI.).

In case of need, the vaginal perforator should be at hand (Fig. 77)—it may be necessary for the

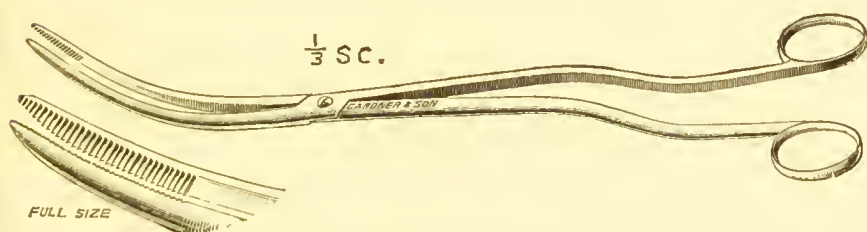


FIG. 77.—Brewis' Vaginal Perforator.

purpose of perforating the vaginal roof when the surgeon desires to carry a dependent drain from the pelvic cavity into the vagina.

Rubber and glass drainage tubes of different diameters should be sterilised. In an operating theatre these are usually at hand already sterilised, by lying in a jar in which they are immersed in carbolic lotion (1-20). Fig. 78 represents Keith's

glass tube, frequently employed for passing down into the Pouch of Douglas for purposes of drainage.

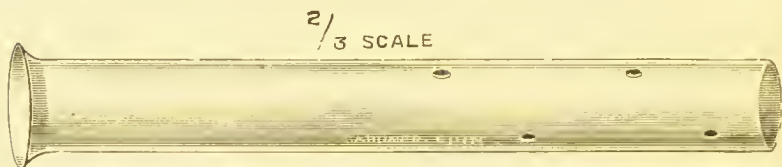


FIG. 78.—Keith's Glass Drainage Tube.

For the removal of a fibroid tumour, a myoma screw (Fig. 79), with which to impale and deliver the tumour, may be required. For the removal of a



FIG. 79.—Myoma Screw.

large ovarian cyst (ovariotomy), the trochar and canula (Fig. 80) should be in readiness with 2 yards or so of rubber tubing fitted to the side tube. By

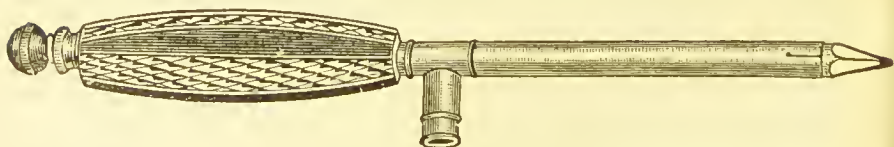


FIG. 80.—Trochar and Canula.

means of this instrument, after the cyst is tapped and the trochar is withdrawn, the fluid escapes by

the side tubing to a pail placed under the table. In this way the collapsed walls of a large cyst can be removed through a comparatively small wound.

For an ovariectomy, also, cyst forceps (Fig. 81) may be required to seize and extract the cyst after

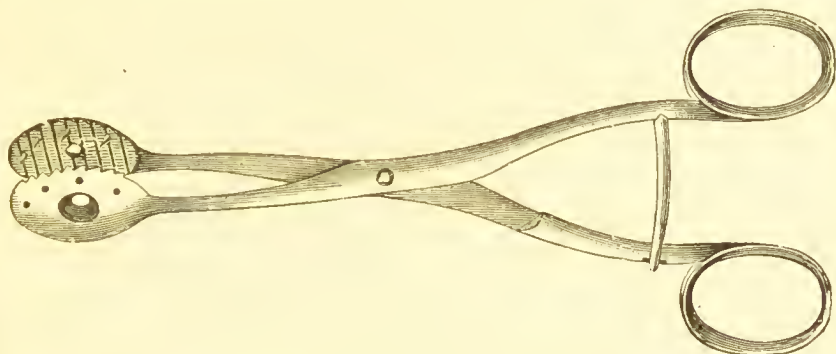


FIG. 81.—Nelaton's Cyst Forceps.

the fluid has been removed. For this purpose Keith's forceps (Fig. 82) may be used, and these possess the

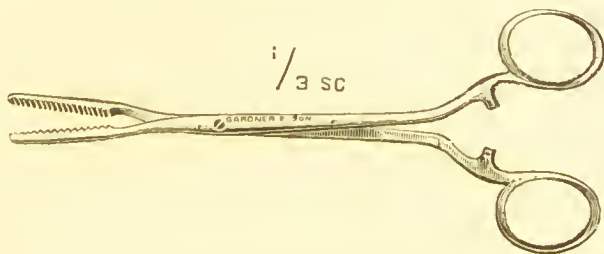


FIG. 82.—Keith's Pressure Forceps.

advantage of being also serviceable as clamp forceps, and are convenient swab-holders.

In addition to the foregoing, for every major operation the apparatus for the intravenous infusion



of saline should be sterilised. This consists of a funnel, a length of tubing, and a metal canula (Fig. 83). This form of treatment is especially efficacious in cases of severe hæmorrhage, collapse, and shock.

Saline fluid may also be introduced under one or both breasts, and for this the same apparatus is

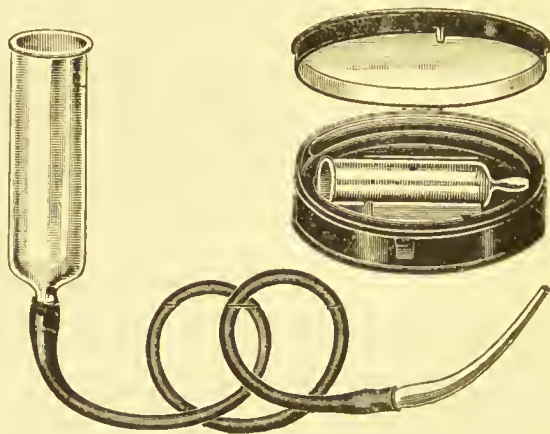


FIG. 83.—Apparatus for Saline Infusion.

required, with the exception that the canula, instead of being blunt, as used for intravenous infusion, must be sharp, for puncturing the skin and tissues of the breast.

Where the peritoneal surfaces are contaminated with infective matter, flushing of the abdominal cavity with warm saline solution may be necessary. For this the irrigation apparatus, consisting of a large glass funnel and a length of rubber tubing attached to a piece of glass tube of wide bore, is required.

*Swabs for Abdominal Operation.*—For an abdominal operation at least twenty-five to thirty *small* gauze swabs and five or ten *large* swabs should be sterilised by steam (see Chapter IV.). These are made up in bundles of five, and in preparing them the greatest care must be taken by the nurse to ensure that the bundles are properly counted. To obviate the risk of miscounting in the preparation of the gauze packages, Mr Cathcart has devised the appliance shown in the figure (Plate IV., Fig. 1). Each swab, after being examined carefully to make certain that it is single, is placed in one of the notches. When five swabs have been thus counted out, they are collected and tied into a bundle. This appliance forms an accompaniment of the instrument devised by Mr Cathcart for facilitating the counting of swabs during the operation (Plate IV., Fig. 2).

For a major operation the nurse must also sterilise at least six *operating gowns* — for the operator, assistant, instrument clerk, nurse, anæsthetist, etc. *Masks* and *caps* for the use of the surgeon and assistants, and caps for the nurses are also sterilised.

In another casket ten or twelve small *towels* should be sterilised for each operation, and in addition the large “laparotomy sheet” with an opening corresponding to the area of operation. A plentiful supply of cotton wool and the requisite dressings must also be sterilised for the operation. Rolls of sterile iodoform gauze of different widths should be in readiness.

Where *rubber gloves* are to be used during the operation, they are sterilised, as described in Chapter IV., either by means of boiling in water for a few minutes or by means of steam. Where the former method is adopted, it should be remembered that soda should not be added to the water, as it exercises a harmful effect on the rubber of the gloves. When sterilisation by steam under pressure is adopted, it is well to know that the gloves are apt to be injured by subjecting them to steam above 15 lbs. pressure.

After the caskets and their contents are sterilised, which may conveniently be done on the day before the operation, the apertures are closed by means of the slides. Just before the operation they are placed side by side on a table in the operating room. When the operation is about to begin, the lids are unfastened and opened by the assistant nurse or other person in the theatre who is in readiness to perform the many duties which do not require sterilisation of the hands.

**Preparation of the Patient for Operation.**—Before an abdominal operation the patient must undergo a thorough course of preparation. She should, when possible, be under the immediate care of the surgeon and nurse for several days before the operation. A practical knowledge of the details of the preparatory treatment assists materially in equipping the patient for the physical strain entailed,

and is an important factor in hastening the recovery after the operation.

In order to harbour up the strength of a patient, and to accustom her to *rest*, she must, if possible, be made to keep her bed for two or three days before the operation. During this time the pulse and temperature are taken night and morning. The bowels should be moved freely once a day, and the urine is measured and tested. The heart and lungs of the patient are carefully examined by the surgeon.

The *diet* should be light and easy of digestion, consisting of thin soups, beef-tea, white fish, an egg, custard or milk pudding, etc., etc. Well-boiled milk gruel may be acceptable once a day, preferably in the evening. Potatoes or meat in any form should be avoided.

A warm bath is given daily, but cannot be continued after the preparation of the skin of the abdomen has been begun. If the patient is unable to get up for her bath, she should be sponged carefully all over in bed. *Care must be taken, in all cases of extra-uterine gestation*, that the patient does not get out of bed for her bath; she should be sponged by the nurse in bed. This precaution is taken to avoid any risk of hæmorrhage, which may result from even slight exertion.

The hair should be washed a few days before the operation. A warm antiseptic *vaginal douche*—lysol (1-100), or corrosive (1-5000) — should be given

twice daily, unless there is some condition which contra-indicates this treatment. An abdominal operation, for example, may be necessary for the removal of a tumour complicating pregnancy. The administration of warm douches in such a case may provoke uterine contractions with the induction of abortion or premature labour.

When possible, the *aperient* — castor oil ( $\frac{1}{2}$  to 1 oz.) being best — should be given *two* nights before the operation. This is advised to ensure that the patient is not unduly disturbed on the night preceding the operation.

On the day before the operation the *preparation of the skin* should be carried out. Before every abdominal operation the *vagina*, also, must be carefully cleansed. During the operation, the surgeon may find it necessary to open into the vaginal cavity for the purpose of detaching the cervix in the case of complete removal of the uterus, or for the purpose of carrying a rubber tube or gauze drain from the abdominal or pelvic cavity into the vagina.

The preparation of the skin commences with the bath taken daily before the operation, and the cleansing of the vagina commences with the course of vaginal douching ; but a more thorough and systematic course of treatment is carried out on the day before the operation.

For the preparation the nurse will take to the

patient's bedside the following articles:—A firm pillow, three mackintoshes of moderate size, two or three towels, a sterilised abdominal square (see p. 307), a quantity of sterile wool, an abdominal binder, a bandage of 4 ins. wide and several strong safety pins, a basin of warm lysol lotion (1-100) and corrosive lotion (1-5000), a rubber flesh brush or an ordinary nail brush previously boiled, a sharp razor or a safety razor, a jar of green turpentine soap, a bottle of turpentine, a bottle of sulphuric ether or alcohol, and a bottle of tincture of iodine with a camel's hair brush.

During the exposure, which will be a fairly prolonged one, the windows should be closed and the room kept comfortably warm.

The nurse begins the preparation by completely shaving the genitals (see Preparation for Minor Operations, p. 170). If hairs exist on the abdomen they must also be removed with the razor.

The vagina and surrounding regions are then thoroughly cleansed, first with lysol (1-100) or green turpentine soap and water, then corrosive (1-2000). The lotions are applied on pledgets of sterile wool held by long forceps, and every crevice of the vagina must be well swabbed, the nurse making sure that she goes all round the cervix and into the posterior fornix. The vagina is then dried with a sterilised swab and loosely packed with prepared iodoform gauze (see p. 310).



The shaving, and the cleansing and packing of the vagina completed, the pillow beneath the back is removed, the mackintosh and towel remaining under the patient. The bedclothes are now drawn up from the foot of the bed to within a few inches of the pubis, and the nightdress is rolled up as far as the mammæ. The mackintosh and towel underneath the patient are tucked between the skin and the nightgown to prevent the latter getting wet. A second mackintosh is then placed over the patient's chest, its edges being well folded in under the rolled up nightgown, and a third, in the same way, protects the bedclothes over the legs.

The nurse should now cleanse her hands. Some green turpentine soap is put upon the centre of the abdomen, and is rubbed all over so as to get a thin film of soap over the whole surface of the abdomen and sides. The rubber brush, dipped in lysol lotion, should then be used in a prolonged and careful scrubbing. The most difficult parts of the abdomen to cleanse are the pubis and the umbilicus. The folds of the umbilicus must be carefully held apart and well scrubbed. Should the patient be very stout, the umbilicus may not be visible—it may be retracted an inch or more from the surface. In such a case, soap should be applied, and cleansing done by a small piece of wool held on a pair of dressing forceps.

The length of time devoted to the scrubbing must



be left to the discretion of the nurse. In most cases the skin can stand from eight to ten minutes of steady scrubbing with the rubber brush without becoming red, but, if redness is seen or the patient complains of any pain, the process must be stopped.

The advantage of the rubber brush is that, being soft and pliable, it can be easily applied to folds of skin in the various regions with a fair amount of friction without causing pain or excoriation of the skin, whereas the strong bristles of the nail brush may cause much discomfort if used in vigorous scrubbing.

If an ice-bag has been used on the abdomen for any length of time before the preparation of the skin, the nurse must use the brush very carefully, as, in this case, the skin is very tender and easily hurt.

In cases of ectopic gestation, pyo-salpinx, or very tense ovarian tumour, the brush must be used very lightly, and all manipulations in the preparation performed very carefully, lest harm should be done by rupturing the tube or tumour.

The scrubbing having been finished, all excess of soap is removed, first with pads of dry cotton wool, and then by wool wrung out of the corrosive lotion.

The nurse should again wash her hands. Turpentine is now applied sparingly over the abdomen, and this is followed by ether<sup>1</sup> or alcohol. Great care must again be directed to the pubis and umbilicus, and

<sup>1</sup> Before applying the ether, the nurse must warn the patient of the icy-cold sensation it produces.

into the latter it is desirable, if it be retracted, to pour some ether.

The last step in the preparation of the skin is the painting of *tincture of iodine* all over the surface of the abdomen, pubis, and flanks, with a camel's hair brush or a pledget of sterile wool held by a pair of forceps. If a brush is used, it must be boiled for a few minutes before using. Of the two methods the wool pledget is the better, as the brush is apt to leave loose hairs on the skin.

The whole of the prepared skin is now covered by the sterilised square, the mackintoshes are removed, and the patient's back, etc., well dried. The binder is now applied and firmly pinned, and additional safety is given by passing the 4-in. bandage once or twice round each thigh, thus forming a kind of figure of eight. Binder and bandage are fixed together with safety pins. By adopting this precaution, the risk of the dressings becoming moved, even if the patient has a restless night, is minimised.

No further preparation of the skin is necessary; the binder is left untouched until the patient is anæsthetised and brought into the operating room.

After cleansing the skin as above, some surgeons, instead of the application of iodine, prefer the use of a "soak." This may consist of a square of several folds of sterile gauze or butter muslin lightly wrung out of a solution of corrosive (1-2000) or carbolic (1-40). It is completely covered by a

larger square of protective or thin mackintosh, and the whole is held in position by the abdominal binder.

The iodine method of preparation the writers have employed for nearly two years, with the most satisfactory results. The iodine has a strong antiseptic influence, and by means of the virtue which it possesses of attracting the white blood-corpuscles to the part concerned, it equips the skin for resisting any organismal infection. As the square placed on the abdomen after this preparation is completed is *dry*, it is worn with more comfort to the patient than the "soak" so frequently employed.

The skin preparation for an abdominal operation may be carried out as above on the morning of the operation day, *i.e.*, the preparation of the vulva and abdomen. By some surgeons this mode of preparation is declared to be as efficient as the above-mentioned methods in which the skin is subjected to the influence of the antiseptic for a longer time. In the case of an operation in emergency, of course, we have no choice in the matter.

It is much more expedient, however, to have the preparation performed by the nurse during the day previous to the operation day. Experience teaches that even the slight annoyance and discomfort associated with the preparation harasses the patient much less when it is carried out thus, than when it is performed immediately before the operation, when,

no matter how placid she may be by nature, she will probably feel nervous and anxious.

Occasionally it is necessary to carry out the preparation after the anæsthetic has been administered, as, for example, when the patient is very ill and is suffering great pain, or is too nervous to allow of the preparation being carried out satisfactorily. In most cases, however, the nurse, by explaining to the patient the advantages of having the preparation carried out before the administration of the anæsthetic, can easily overcome any scruples which she may have in the matter.

The rubber brush should be carefully cleansed after being used by running a stream of warm water over it; by bending its back the water is allowed to get well in between the bristles. It should then be dried and put away in a small glass jar. Before being used it is boiled for a few minutes in *plain* water. The presence of soda is apt to harm the rubber.

The necessity for attending to the many details of the skin preparation cannot be too strongly impressed on those new to the nursing of gynæcological cases. In this way the risk of the formation of a stitch abscess is minimised, an accident which causes pain and delays the process of healing, and accordingly, if at all extensive, prolongs the convalescence of the patient and submits her to the distress of having the wound frequently dressed.

On the morning of the operation a *soap and water enema* should be given to thoroughly cleanse the rectum. The patient may have a cup of tea, or beef-tea if preferred, with a small piece of dry toast three or four hours before the time fixed for the operation. She should be clad in a nightgown and flannel bed-jacket, preferably opening at the back to allow of their being changed without causing the least disturbance to her. A pair of white woollen stockings, reaching half-way up the thigh, should also be worn. The hair is divided at the back of the head and arranged in a plait at each side, no hair-pins being used. If ear-rings are worn, they must be removed.

Just before the anæsthetic is given, the patient should be asked to empty her bladder; thereafter the external genitals should be sponged. If she is unable to empty her bladder, which sometimes happens as the result of extreme nervousness, the catheter should be used.

Some gynæcologists prefer to have the catheter passed just before the anæsthetic is given, in all cases of major operation, and the nurse who does this must note and be able to inform the surgeon accurately as to the *length* to which the catheter is introduced before the urine escapes, and the *direction* in which it passes, together with the *amount* of urine drawn off.

If artificial teeth are worn, they must be removed.

**Preparation on Operating Table.**—As already mentioned in Chapter XVI., the patient should, when possible, be anæsthetised before being moved from her bed. When under the anæsthetic she is lifted on to the operating table, a linen cap is put on, and her nightgown is folded up all round. She is laid in the dorsal position, resting on a double blanket, which is protected by a mackintosh or a rubber pad with inflated rim, covered by a large towel. If a mackintosh is used, a small pillow should be placed under the mackintosh at the small of the back to prevent fluid and blood from running along the back while the patient is in the Trendelenburg position, and thereby soiling her clothing. The shoulder rests are fixed, to prevent the patient from slipping when the table is swung into the above position. Sterile linen stockings are now drawn on over the white woollen ones. The hands may be secured by folding them across the chest, under the turned-up nightdress, which will keep them in position, or a bandage may be attached to each wrist and the hands raised to the level of the shoulders, where they are secured by tying the bandages under the back of the neck.

Another method, sometimes adopted, is to extend the arms on each side and fasten them to the table by bandages attached to the wrists, great care being taken that they do not hang over the sides of the table.



Patient ready for Abdominal Operation.





A small, clean blanket is wrapped round the chest and another round the lower extremities, and these are covered by thin mackintoshes. The binder and square are then removed by the assistant nurse, and the abdomen is rubbed with alcohol. Sterile sheets or towels are then placed over the mackintoshes, one just above the field of operation and another just below it. The patient is then covered by the "laparotomy sheet," placed so that the slit corresponds to the area where the incision is to be made (Plate III.).

**Preparation of the Bed of the Patient.**—The careful preparation of the bed is a duty every nurse is expected to understand, and many comforts can be thus bestowed upon a patient in the early days of her convalescence.

The two great aims of the nurse in this preparation must be, firstly, to have everything absolutely clean, and secondly, to arrange draw-sheets, etc., in such a manner as to minimise the moving of the patient.

Accordingly, the bedstead should be thoroughly cleaned, carbolised, and provided with a clean hair mattress. All sheets, blankets, etc., must, of course, be perfectly clean.

A draw-sheet may be used in various ways, but the following arrangement is found useful. Two draw-sheets and two pieces of thin mackintosh are

required. A large draw-sheet covering a large area of the bed, and extending upwards beneath the patient's shoulders, is not only unnecessary but a great source of annoyance in its removal, which from the large size is rendered more difficult. The draw-sheet and mackintosh, therefore, should not exceed three-quarters of a yard in width.

The first piece of mackintosh is laid across the bed, the upper edge coming to about 12 ins. below the pillow. Exactly over this is placed the first draw-sheet, which, after being carefully laid so that no creases remain, is, with the mackintosh, pinned at the four corners to the under-sheet and mattress by large safety pins. The second piece of mackintosh and second draw-sheet are now put on over these in exactly the same manner.

After abdominal section or vaginal hysterectomy, it is important that the patient should be moved as little as possible for the first few days; and if the above plan is followed, the nurse will be able, when necessary, to remove with ease the top draw-sheet and mackintosh, leaving the patient on the clean lower draw-sheet. To do this the patient should never be allowed to raise herself in bed. One nurse will gently raise her, while a second quickly withdraws the soiled draw-sheet and top mackintosh. It is well known that the removal of a draw-sheet from the bed of a helpless patient is a much simpler matter than the putting on of a clean one; and if due care be

taken by the nurse, two draw-sheets should be sufficient to last until all risk in moving the patient is over.

The bedclothes should consist of a light blanket next the patient, and over this a sheet, another blanket, and a light cover. This is seldom found insufficient if the room is kept at a temperature of 60° Fahr. When the patient has recovered from shock, the blanket immediately covering her may be removed.

Just before the operation begins, at least two hot bottles are placed in the bed and covered up; when the patient is brought from the operating room, the bed will be thus made warm for her. Two wooden blocks should be in the room, so that, if necessary, the lower end of the bed may be raised, in order to hasten the patient's recovery from the shock of a prolonged operation. In such cases the pillow should be removed, so that the patient's head may be kept low.

## CHAPTER XXII

### THE OPERATING ROOM

THE room to be used for an operation should possess three qualifications : it should be well and uniformly lighted, it should approximate as nearly as possible to a state of perfect surgical cleanliness, and it must be heated to a sufficiently high temperature to prevent the chilling of the patient, which can so easily occur while she is under the anæsthetic.

In hospitals and nursing-homes where a room has been specially constructed and set aside for operative purposes, it is comparatively easy to ensure the presence of the requisite qualifications.

Where it is necessary to operate **in a private house**, however, it is not always possible to obtain a room perfectly adapted for the purpose of operation, but with care and thought the surgeon and nurse are often able to transform the room at their disposal into a state sufficiently serviceable.

Good light in the neighbourhood of the operating table is essential ; if not sunlight, a sufficiently powerful electric or gas light above the table.

All unnecessary articles of furniture must be removed from the room—the only requisites being a table for the patient, two smaller tables for the instruments, dressings, etc., and a chair for the operator if the operation is performed in the lithotomy position. To accommodate the patient a narrow kitchen table is usually large enough. If it is too short, the length may be conveniently increased by placing a smaller table transversely at one end. In the case of an abdominal operation the head and shoulders of the patient rest on this table; when the operation is to be performed in the lithotomy position it supports the legs, and is removed just before the operation begins.

If the room is not to be used by the patient subsequent to the operation, the carpets should be removed a day or two before and the floor scrubbed well. The walls, doors, shelves, etc., are mopped down with a damp cloth to remove dust. The operating table and the other tables are thoroughly scrubbed. Where it is impossible, as in an emergency, to lift the carpets at least twenty-four hours before the operation, they should be left, as their removal occasions the stirring-up of the dust in and under them.

At least two basins, and three kitchen bowls for the lotions, etc., thoroughly cleansed by washing with a strong lysol solution, should be in readiness. A plentiful supply of hot and cold boiled water, con-

tained in properly cleansed jugs or ewers, covered with clean towels to prevent the possibility of contamination, will be necessary. There should also be eight or twelve clean towels at hand.

Where the operation is to be performed in the lithotomy posture, or where a large ovarian cyst is to be removed, a clean pail will be required.

**In hospital practice** the operating theatre is so placed and provided with windows in such a way as to obtain a plentiful supply of diffused daylight. To ensure a good and uniform light the walls are white enamelled or laid with white tiles.

The theatre must be kept in a state of scrupulous cleanliness. To facilitate this the furnishings—stools, tables, etc.—should be of as simple a nature as possible, and the fittings—pipes, etc.—should be reduced to a minimum. For this reason the sterilisation apparatus for the instruments and dressings should be in an adjoining room.

The floor consists of an easily cleansed material, either tiles or terrazzo, and, to prevent the accumulation of dust and render access easy for purposes of washing, the corners of the walls are rounded. The walls and floor should be frequently washed, and should be mopped daily to prevent the accumulation of dust.

The stools, tables, etc., should be frequently washed with soap and water, and lotion bottles and jars, and the glass table-tops should be thoroughly washed before every operation with a solution of lysol.



In dusting the theatre on the operating morning a *damp* cloth must be used; otherwise the dust is stirred up into the air.

The arrangement of the theatre furnishings is left to the nurse, and she must see that everything is in its right place before the operation begins.

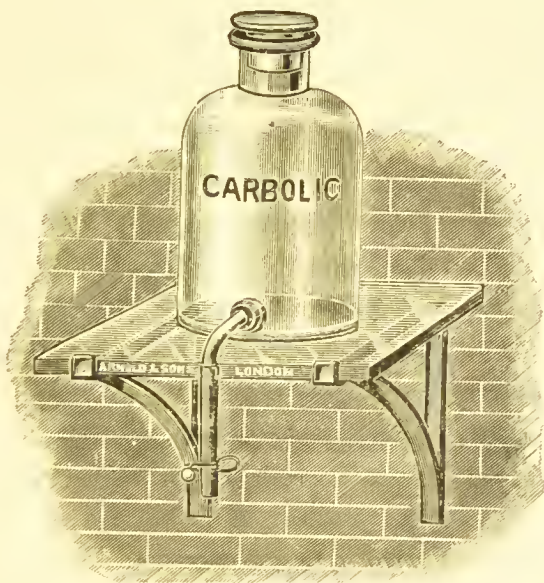


FIG. 84.—Lotion Jar.

Before describing the arrangement of tables, lotions, etc., mention should be made of the fact that all windows ought to be shut, so that no current of air can carry infection into the abdomen, or chill the patient. The *temperature* of the room should be strictly attended to, and on no account should ever be allowed to fall below 65° Fahr.—the best tempera-

ture being 70° Fahr., which is neither too warm for an anæsthetised patient nor too great for the operator.

The jars for the lotions are placed in a convenient position in the theatre. Each jar should have the name of the lotion it contains painted on, and each lotion should have a distinctive colour (Fig. 84).

The *wash-hand basins* should be scrupulously clean. To avoid the possibility of the hands being contaminated by the use of the ordinary taps, in a properly fitted theatre the water is supplied to the basins by a pedal arrangement (see Fig. 85). Close at hand should be a jar of green turpentine soap and small bottles of turpentine, sulphuric ether, methylated spirit, and pure lysol. A large bottle of saturated solution of permanganate of potash and of oxalic acid should also be in the theatre.

*Nail brushes* should always be boiled before operation, and kept in a glass jar of carbolic lotion (1-20). A dozen brushes should be available. There is nothing that annoys a surgeon more than to have to attempt to scrub his hands and arms with an old, worn nail brush. The nurse must, therefore, always see that the brushes are in good condition, with strong bristles well fixed and close together. An ordinary strong brush with an unvarnished wooden back is the best, as it can be sterilised without harm.

The *operating table* is placed in a position where good light can be obtained. A blanket is spread

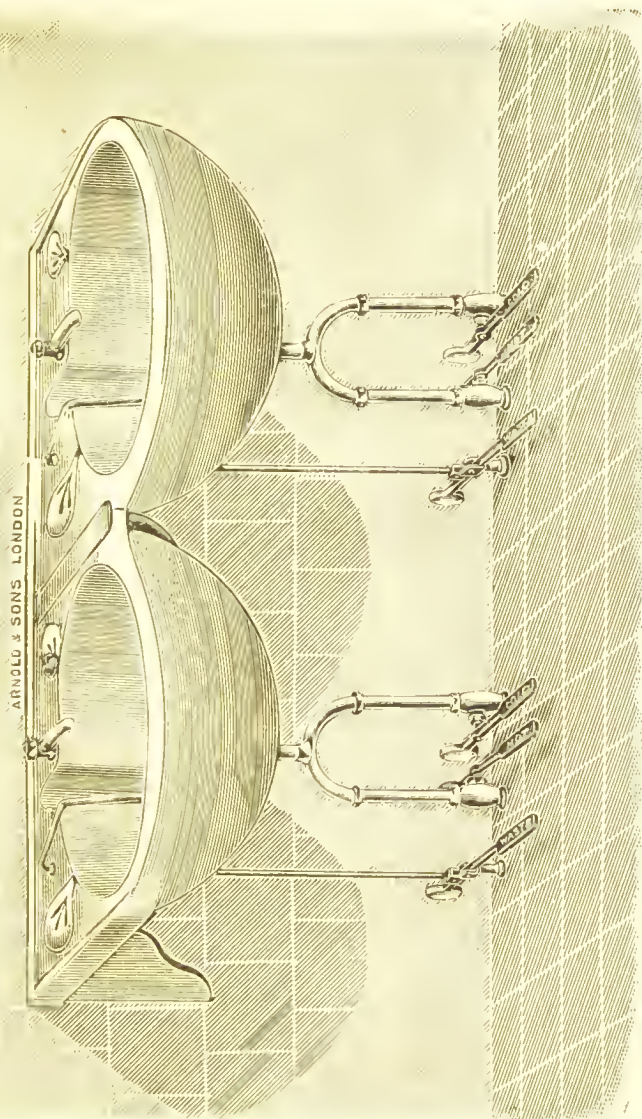


FIG. 85.—Wash-hand Basins, showing Pedal Arrangement for Supply of Hot and Cold Water, and for the Opening of Waste Pipe.

over it, another is laid folded at the foot—this being used to cover the patient's limbs during the operation.

There are many different varieties of operating tables for gynæcological practice on the market. A properly equipped gynæcological table is so constructed as to permit of its being easily tilted into the Trendelenburg position during an abdominal operation, and for minor operative work the table is provided with detachable leg rests, in which the legs of the patient are fixed to support her in the lithotomy position (see Fig. 63, p. 177).

The arrangement of the table for the reception of the patient in the case of a minor operation, and in the case of abdominal section, is described in the respective chapters devoted to these subjects.

The table is provided with two curved rests to support the shoulders, and thus prevent the patient from slipping off when the Trendelenburg position is employed. In this position the head of the table is lowered, and, after the abdominal cavity is entered, the intestinal coils gravitate towards the diaphragm and thus allow of an uninterrupted view of the pelvic contents. Fig. 86 represents the Trendelenburg position. As previously mentioned, more complete relaxation of the abdominal muscles is obtained by having the legs raised more in a line with the body. In this position the shoulder-rests are quite sufficient to support the patient (see Plate III.).

This position may be desired at any moment

during the operation, and the nurse must therefore beforehand ensure that the table is in good working order.

For the instruments, dressings, etc., at least two tables, each preferably with two or three shelves,

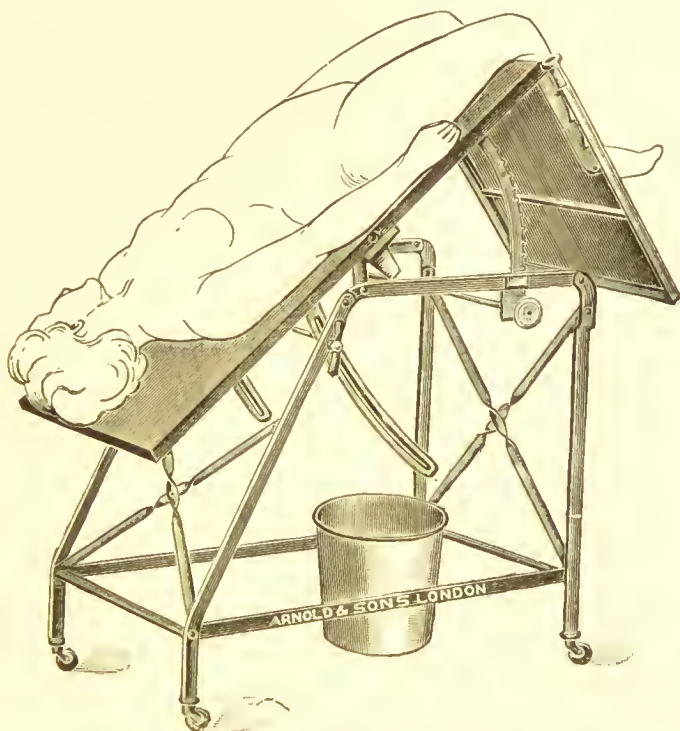


FIG. 86.—Trendelenburg Position.

should be in the operating room, one for the instrument clerk, and one for the caskets with sterilised dressings, etc., under the care of the senior nurse.

The instruments, which are sterilised by boiling in a soda solution (see Chapter IV.) just before the opera-



tion begins, are transferred by the instrument clerk, who has carefully cleaned his hands and covered them with sterile gloves, to two or three trays containing sterile water in sufficient quantity to cover them.

Knives may be sterilised by boiling for half a minute in soda solution, precautions being taken to prevent dulling of the cutting edge, or they may be sterilised by immersion in pure lysol (see Chapter IV.).

The instrument trays lie on the top shelf of one of the tables. Beside them is placed a basin of weak antiseptic lotion or saline solution, in which the instrument clerk frequently rinses his hands.

On the lower shelf, over which the senior nurse has charge, a large basin should be placed to receive soiled swabs.

The nurse must also have at hand a supply of mackintoshes, which have been carefully cleansed with soap and a weak lysol lotion. They are then sponged over with 1-20 carbolic and are hung up to dry.

Rolls of sterilised iodoform gauze of different widths should be in readiness (see p. 310).

Adhesive plaster, a bottle of collodion with brush attached, binders 12-14 ins. in width and long enough to go one and a half times round the patient, must all be ready.

There should be an ample supply of boracic, carbolic, corrosive, and lysol lotions. At least 4 galls.

of sterile water near the boiling point, and 2 galls. of cold sterilised water should be provided for each operation.

Beside the operator and the assistant there should be two basins, one containing corrosive (1-2000) or lysol (1-100), and the other containing saline solution.

A plentiful supply of sterilised normal saline solution should be in the operating room. It is prepared in the proportion of one teaspoonful of salt to a pint of water, and the solution is boiled for ten or fifteen minutes. If it be used for the purpose of irrigating the peritoneal cavity, the saline solution is used at a temperature of 100° Fahr., and if for sub-mammary or intravenous infusion, at a temperature of 103° Fahr.

The nurse will prepare the chloroform mask by covering it with several folds of gauze or a piece of lint. The edges should be cut to within half an inch of the edge of the mask. A small jar of pure vaseline should also be at hand in case the anæsthetist should wish to smear the face of the patient to protect it from the irritation sometimes caused if chloroform is used. For his use also a gag, a pair of tongue forceps, a minim glass, a small bottle of strychnine, a bottle of pure ether, and a hypodermic syringe in thorough working order, fitted with an aseptically clean needle, should be placed near the head of the table. Several small towels should also be at hand for his use.



## CHAPTER XXIII

### DUTIES OF ASSISTANTS DURING THE OPERATION

THE most important duty of the senior nurse during the operation of abdominal section is that of looking after the **swabs**.

As already mentioned in the chapter on Preparation for Abdominal Section, about thirty small and five large or medium swabs (see Chapter XXVI.) prepared in bundles of five are sterilised for each abdominal operation.

The small swabs are employed for the purpose of sponging up blood, etc., during the operation, and are kept dry. The larger swabs, on the other hand, are used for packing into the abdomen to prevent the intestines from obscuring the field of operation; or for the purpose of packing round an ovarian cyst before it is tapped, to prevent the fluid, which may be infective, from trickling into the peritoneal cavity. As it is advisable that the peritoneal surfaces of the bowel and abdominal walls be kept moist and warm during the operation, the larger

swabs before introduction are wrung out of hot saline solution.

Large swabs soaked in warm saline are also used to cover and prevent the chilling and drying of bowels, which, during the operation, are exposed for any length of time. By keeping the bowel warm, the risk of shock supervening after the operation as the result of the exposure of the peritoneal surfaces is avoided.

Each of the large and medium abdominal swabs has a piece of tape, 6 ins. in length, sewed to one end of it (see p. 306), and to this tape an artery forceps is attached before the nurse hands the swab to the operator. If the nurse observes this precaution, the danger of leaving a swab in the peritoneal cavity is reduced to a minimum.

Should the nurse carelessly hand her large swabs at times when small ones would have served the purpose equally well, she will not be able to supply the necessary large ones, when these are desired. Therefore, to hand swabs of the required size at the proper time will show that the nurse understands her duty. Accordingly, unless specially asked for large ones, the nurse will continue to hand small swabs for the purpose of drying bleeding surfaces. When the bleeding is coming from a point deep down in the pelvis, the nurse should be ready to supply a series of small swabs on holders or grasped tightly by long forceps.

After some experience the nurse learns to anticipate the wishes of the operator, and can at once hand the swab desired.

The swabs should be passed from the casket to the operator by means of sterilised forceps; this is especially important if the hands are not covered by gloves.

The most responsible duty which devolves upon the nurse is that of *counting the swabs* and ensuring that, just before the operator closes the abdominal wound, all the swabs used have been recovered. It is remarkable how easily a swab in the abdominal or pelvic cavity can escape detection, and, unless the greatest care be exercised on the part of the nurse, one or more swabs may be left, and subsequently give rise to troublesome and even dangerous symptoms.

At the beginning of the operation the number of swabs used is carefully noted, twenty-five or thirty, as the case may be.

The soiled swabs are collected in a basin on the second shelf of the nurse's table, and the number of these must be known at any moment. They should be put into the box for soiled dressings, or rolled in a large swab, ten or a dozen at a time, as the operation proceeds, having first been counted by the senior nurse and checked by her assistant.

If there is the slightest doubt as to one being missing, they should be carefully counted over again,

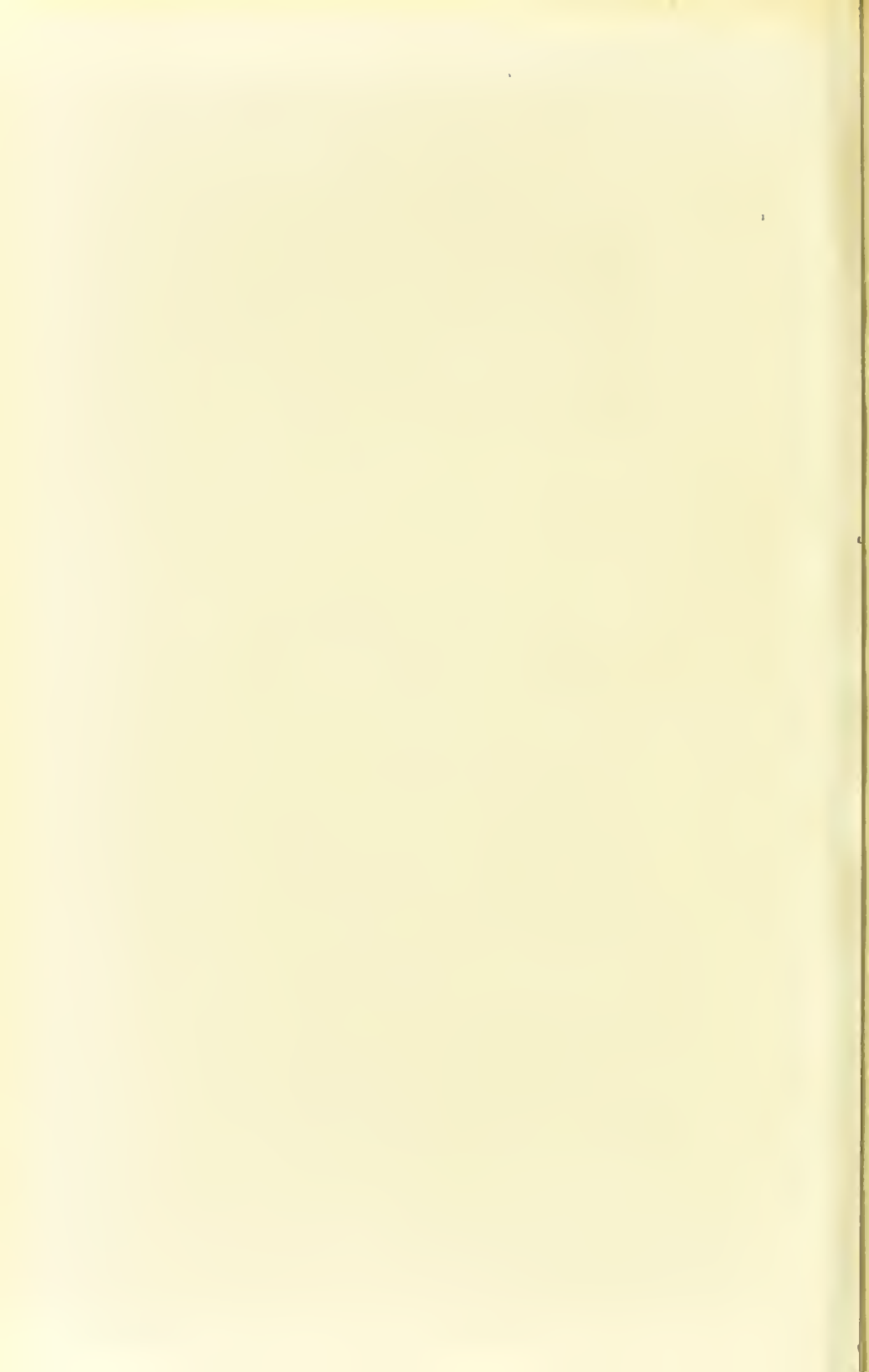


FIG. 1.



FIG. 2.

Cathcart's Appliances for Swab-counting.



as, until it is found, the abdominal wound cannot be closed.

When a swab is missing, it is well to know where, in all probability, it may be found.

The first place to look for a lost swab is, naturally, on the floor. The space between the patient's flank and the lower sterilised towel, and the basin into which the tumour has been placed after its removal, are likely places ; and, in the latter, it is not a very rare thing to find missing pairs of artery forceps clinging to the wall of the cyst or tumour.

The surgeon will not close the abdomen before all swabs have been recovered, and the nurse must beware of saying that the number is complete without being *absolutely certain of that fact*. There is more than one case on record where the missing swab or sponge had not been recovered, until it was found in the abdominal cavity after having caused the death of the patient.

An appliance devised by Mr Cathcart has been found invaluable in facilitating the counting of swabs, especially in cases where a large number is required. As shown in the figure (Plate IV., Fig. 2), it consists of an upright metal plate provided with a number of triangular perforations. As the swabs are returned, they are pushed at once each into one of the perforations. By introducing the swab from behind and pulling the end well down into the dependent apex of the triangle, the swab is grasped without the risk of

being damaged. Where bundles of five are used, it is convenient to have the holes in the plate in rows of five each. A glance at the appliance reveals at any time during the operation the number of swabs used, and by comparing this with the swabs still unused, we can readily tell the number still unrecovered.

Any swab or instrument that has fallen upon the floor must be noted, but must on no account be picked up by the senior nurse or instrument clerk. It is lifted up by a nurse or assistant engaged in the many duties which do not necessitate the sterilisation of the hands. If it be an instrument to be again used, it is placed in the steriliser and boiled for five minutes or so.

With regard to the duties of the instrument clerk, it is necessary to state that the most scrupulous attention to asepsis must be observed. To eliminate the risk of the **instruments, ligatures, and sutures** becoming contaminated by the hands, these should be covered by sterile gloves. This risk of infection is found more particularly in the case of the ligatures and sutures when, as frequently happens, it is necessary to straighten out the material used, before handing it to the operator. This is usually done by drawing the fingers firmly along the material, and unless the hands are covered with gloves, the pressure exerted may force organisms still lurking in the hair follicles, etc., on to surface of the suture or ligature material.



In passing ligatures and sutures to the surgeon, the greatest care must be taken to prevent them from becoming infected by touching the table, etc. This risk is obviated by holding up the dependent end of the suture or ligature with the palm of the hand.

The instrument clerk must know the number of artery forceps in use, and must ensure that, before the abdominal wound is stitched up, they have all been recovered. By this means the risk of a forceps being left in the abdominal cavity is eliminated.

The nurse in charge of the swabs has charge also of the sterilised **towels and sheets**. When these become excessively soiled, they should, at a moment convenient for the operator, be replaced by clean ones.

The **lotions** for the hands of the surgeon and assistant should be changed frequently during the operation.

The assistant nurse should have a basin or dish in readiness to receive a tumour, etc., removed during the operation.

If the peritoneal surfaces have been contaminated during the operation by pus, etc., the *irrigator* (see p. 212) may be used to cleanse the peritoneal cavity. The best fluid for irrigation is sterilised water or saline solution. It must not be used at a heat greater than 100° Fahr., and, if the thermometer in the jar indicates a higher temperature than this, cold sterilised water must be added till the proper heat is obtained.

The nurse, when the irrigation is completed, will be ready to hand large swabs and smaller swabs on handles, by which the fluid is removed from the abdominal and pelvic cavities.

Should the patient have become very collapsed from a prolonged operation, the second nurse may be required to administer a stimulating enema while the patient is on the table. It should be introduced slowly, and prevented from returning by the application of pressure to the anus with a towel or pad of wool.

In cases of severe collapse from much loss of blood or from any other cause, the surgeon will probably resort to the **transfusion of saline solution**. In other cases, and sometimes simply as a measure to prevent the development of collapse or shock, 1 pint or 2 pints of saline solution at a temperature of 100° Fahr. are poured into the abdominal cavity before the wound is completely closed.

In transfusion the saline solution may be introduced into one or both breasts, or directly into a vein, one of the veins at the bend of the elbow being usually chosen for this purpose.

The skin of the region concerned, the lower margin of one or both breasts, or the skin of the front of the elbow is thoroughly cleansed by washing with soap and a lysol solution, and is then sponged with ether.

The sterile saline solution, prepared in the proportion of one teaspoonful of common salt to a pint of

water, is used at a temperature about  $103^{\circ}$  or  $105^{\circ}$  Fahr. An approximate mode of telling if the solution is of the required temperature is to drop some on the bare arm; if it is just uncomfortably borne the saline is of the required temperature. About three or four pints of the solution should be ready.

The apparatus required is described and figured on p. 212. In the case of intravenous infusion the following are necessary besides:—Knife, scissors, dissecting forceps, aneurism needle, and catgut; also a few swabs and a bandage for winding tightly round the upper arm to obstruct the venous flow and thus throw the veins into relief. This bandage, of course, is removed after the canula is introduced, to allow the fluid to pass into the vein.

Before the canula is introduced into the breast or vein, as the case may be, the funnel is filled and the fluid is allowed to flow through the apparatus, thus dispelling the air. Whilst the canula is being introduced the tubing is clipped with the fingers.

The funnel is now elevated four feet or so, and the fluid flows into the vein or into the breast tissues, as the case may be. The nurse must keep a constant watch on the level of the fluid in the funnel, which is replenished from time to time. If this precaution be not observed, air may pass into the vein and give rise to dangerous symptoms.

The temperature of the fluid used must be tested from time to time; if it sinks below the required

degree the level is raised by the addition of hot solution. When the needle is withdrawn, the nurse will cover the puncture in the skin with collodion and gently massage the breast. In the case of intravenous transfusion the wound is covered with a simple dressing.

When the operation is finished and the first dressing applied, the second nurse will remove towels, mackintoshes, and then carefully dry the patient's back, after which the senior nurse will hand to the assistant the additional dressings, plaster, pads of wool, etc. When those are applied, the flannel binder, if employed, is folded tightly round the abdomen and fixed by safety pins. A binder is unnecessary, unless the abdominal wall has been greatly stretched by a tumour.

The binder should be handed rolled up, and, when applied, it should not come too far down when there is the risk of its becoming soiled.

When this is done, the patient should be removed from the theatre to the bed, which has been prepared in the manner already described in the chapter on the Preparation for Abdominal Section.

## CHAPTER XXIV

### AFTER-TREATMENT OF ABDOMINAL SECTION

AFTER the operation the patient is gently removed to bed, where she is laid flat on her back. To prevent the risk of the tongue falling back, and thus obstructing the breathing, the head is turned to one side. The room in which she lies should be kept quiet and should be darkened by drawing down the blinds; by these means the patient may be allowed to pass directly from the anæsthesia into a soothing sleep.

If, as frequently happens, the tongue tends to fall back and obstruct the breathing, the nurse should draw the jaw well forwards by pressure exerted in the region of the angles of the jaw or the chin. The pulse, temperature, and respirations should be charted every two hours. Save under exceptional circumstances, the patient should not be wakened for the purpose of taking the temperature; the pulse, however, and the respirations may usually be quite easily taken without disturbing the patient.

**The Pulse.**—Before proceeding to describe the details of the after-treatment of abdominal section, it

is convenient at this point to emphasise the importance of the pulse. It must at the outset be clearly understood that *the pulse is the chief index of the condition of the patient*. This is especially the case in abdominal work, where, in comparison with the pulse, the temperature and the respirations occupy a position of secondary importance as individual gauges of the state of the patient.

For this reason the rate of the pulse must be frequently ascertained, and a nurse must accordingly, to begin with at least, be in constant attendance at the bedside of the patient.

Immediately after the operation a pulse of 110 or even 120 after a prolonged anæsthesia need not cause anxiety. In the course of an hour or two it gradually slows down, and twelve hours or so after the operation has sunk to 90 or 100. The refusal of the pulse to diminish its rate or a steadily increasing rapidity usually indicates the presence of shock or hæmorrhage.

The *temperature* and the rate of the *respirations* must also be carefully noted. An elevation in the temperature of a degree or so on the evening of the operation day is of frequent occurrence. Thereafter under ordinary circumstances it sinks to normal, where it remains.

**Shock.**—This is the state of depressed vitality which follows on most major operations in a greater

or less degree. It is particularly apt to be found after a prolonged anæsthesia, and especially if during the operation there was much hæmorrhage.

Its presence is indicated by pallor of the face, rapidity of the pulse, and, after the recovery of consciousness, by the presence of an undue listlessness and of dulled sensibilities.

To prevent its occurrence the patient must be kept warm during and after the operation. For this reason the bed which is to receive the patient is heated by means of **hot bottles** or **hot bags**, which are applied to the feet and sides after her removal from the operating room. In the use of the hot bottles the greatest care must be exercised, for a patient who has not quite recovered from the effects of the anæsthetic, and who is in a depressed state of vitality following on the operation, may be severely burned by the injudicious application of the heat. The skin of a patient in this state is as easily destroyed by the action of heat as that of one whose limits are paralysed by disease. Great care should therefore be taken that no bottle is placed too near the skin, and also that *every bottle used is completely covered by a flannel bag*.

The **elevation of the foot of the bed** on blocks (8 to 10 ins. in height) may prevent the onset of shock, and, when it has set in, may act beneficially by aiding the weakened circulation to return the blood to the heart.



A **nutrient enema** of beef-tea with the addition of  $\frac{1}{2}$  to 1 oz. of brandy, or a **saline enema** repeated if necessary every four hours, may be found helpful in combating shock. For the nutrient enema 4 ozs. of beef-tea are ample, and for the saline enema 1 pint of a warm solution of salt, in the proportion of 1 teaspoonful of salt to the pint of water, should be given.

In the administration of the enema it is advisable to carry the solution high up into the rectum. This is best done by means of an ordinary red rubber catheter (size 12) attached by means of a small piece of glass tubing to a yard or so of rubber tubing on which there is fitted a glass funnel. The solution to be given is poured into the funnel and allowed to escape from the eye of the catheter, thus dispelling the contained air. The catheter is introduced into the rectum about 8 ins. or so, and by elevating the funnel the fluid is gently forced into the bowel (see p. 270).

If the condition of shock does not react favourably to these measures the **hypodermic administration of stimulants**, such as strychnine ( $\frac{1}{80}$  to  $\frac{1}{40}$  of a gr.), digitaline, or strophanthine ( $\frac{1}{100}$  gr.) may be necessary; it may be repeated every four hours under the supervision of the surgeon.

In other cases the shock may be so severe as to necessitate the introduction of a quart or so of **saline solution into a vein or under the breasts**.

For severe failure of the heart during or after

an operation the **application of heat over the heart** is often of great service, and a pulse will sometimes respond to heat thus applied when it remains unaffected by other stimulants. The fomentations used consist of several layers of flannel wrung out of water near the boiling-point. One cloth is applied for about twenty or thirty seconds, and is immediately followed by another. The successive application of these hot flannel fomentations may be kept up for three minutes, till the pulse shows signs of improvement. To prevent blistering, olive oil or vaseline should be rubbed generously over the skin without a moment's delay after the last cloth has been removed.

**Anæsthesia Sickness.**—Post-operative sickness, due to the poisoning of the nerve centres with the anæsthetic employed, occurs in a large proportion of cases, and is often one of the most troublesome conditions with which we have to contend in the after-treatment of a case. When it occurs, it usually sets in as the patient is coming out of the anæsthetic, or immediately after consciousness is regained, and is apt to continue till the anæsthetic has been eliminated from the body by means of the kidneys, skin, and lungs. In some cases, however, it does not begin till eight or twelve hours after the operation.

The act of vomiting is often preceded by a sudden pallor of the face, and if the fingers be placed on the wrist the pulse is found to have become unexpectedly

more rapid. The patient retches, and after bringing up some mucus, or bile-stained fluid, again becomes quiet. The pallor disappears and the pulse in a minute or two has resumed its previous rate.

The nurse in attendance should be continually prepared for the occurrence of sickness, and should have at the bedside of the patient a small vessel to receive the vomit and a soft towel with which to wipe the mouth. To prevent soiling of the bed-clothes during an unexpected act of vomiting, it is also advisable to turn the head of the patient on one side, under which a towel is placed.

During the act of vomiting the head of the patient should be turned well round on one side, to allow the vomited matter to escape from the mouth. This is especially important in the semi-conscious stage which precedes the recovery of consciousness; if the patient be unattended to, the vomited material may be inhaled and produce a dangerous asphyxia, or may subsequently induce a fatal pneumonia.

During the early attacks of sickness the patient, being still semi-conscious, feels little pain; as her sensibilities are regained, however, the pain, caused by the straining of the abdominal wound during the process of retching, may be very severe.

To support the wound and to relieve the pain experienced by the patient, the nurse should, during the act of vomiting, press firmly against the flanks and towards the middle line to relax the muscles

and skin in the region of the wound. When the hands are applied as splints to the abdominal wall in this way, the act of vomiting may be rendered comparatively painless. To be efficient the pressure exerted should be considerable in amount; feeble support may actually increase the pain.

Besides the danger and discomfort associated with the tension on the wound stitches as the result of vomiting, the violent abdominal movements may, in rare cases, cause slipping of the ligatures in the pelvis, with the production of dangerous hæmorrhage.

The anæsthesia sickness may last for eighteen or twenty-four hours. In the earlier stages the vomited matter consists of mucus, sometimes bile-stained, and is usually small in amount; if the sickness continue for any length of time, the vomit becomes of a deep green colour from the presence of a considerable quantity of bile, and is sometimes copious. After severe retching the vomited material may contain "coffee ground" matter from admixture with altered blood.

When the sickness is prolonged a large feeding-cupful of hot water, to which a half-teaspoonful of sodium bicarbonate (baking soda) may be added, if administered in sips may have a successful result. It is usually returned at once, and the cleansing effect on the stomach seems to allay the troublesome retching.

After the recovery of consciousness, in addition to

the anæsthesia sickness, two conditions from which the patient almost invariably suffers are pain in the back and intense thirst. The mode of treating pain in the back will be described in the paragraph devoted to the discussion of Pain and Sleeplessness.

**Thirst.**—This, which is often a most distressing symptom, is usually complained of from the first. It is all the more distressing because, where the patient is suffering from anæsthesia sickness, it is necessary to withhold fluid by the mouth for at least twenty-four hours.

The mouth should be washed out frequently with a little hot water, and of this the patient is allowed to swallow a teaspoonful or two occasionally. This often suffices to satisfy the immediate cravings of the patient, and by moistening the dry, parched tongue and lips, imparts a general sense of comfort.

When there is extreme thirst, a saline enema may give relief. This, about a pint in amount, should be introduced high up into the rectum, and may be repeated, if necessary, in four hours' time. By raising the foot of the bed, the enema may be more easily retained.

Where, after twelve or sixteen hours, the patient has shown no signs of anæsthesia sickness in the shape of nausea or vomiting, hot water may be allowed in more liberal amount. If it does not disagree, cold water, or potash, or soda water may

be given and cautiously increased in quantity until the thirst of the patient is satisfied. With the least evidence of sickness, the fluids must be immediately withheld.

**Care of the Bladder.**—Patients differ greatly as regards the function of micturition after operation. One patient may be able to pass urine easily a few hours after the operation; others, especially those of a nervous temperament, may be unable to urinate naturally for two, three, or even six or seven days.

With a few exceptions to be immediately referred to, patients should be encouraged to pass urine naturally from the beginning. If the catheter is once passed, it may be necessary to continue its use for days before the patient recovers the normal function.

The nurse may with advantage allow ten hours or so to elapse before asking the patient to pass urine. During that time, under ordinary circumstances, a considerable quantity of urine will have collected in the bladder, and the chance of the patient's attempt to micturate being successful is greater than it would have been had she been asked to pass urine when the bladder contained only one or two ounces.

If the end of the bed has been raised on blocks for the treatment of shock, these should be removed whilst the patient endeavours to micturate.

The ordinary bed-pan may be used; the best

vessel, however, is a small slipper-pan, which from its shape causes less inconvenience.

The greatest care must be taken by the nurse to prevent the patient from raising herself to allow the introduction of the bed-pan. Even the slight exertion thus entailed may fatigue the patient, and in some cases may be followed by dangerous collapse. Short of this, any exertion on the part of the patient throws an undue strain on the abdominal wound. For these reasons the patient must be gently raised by the nurse to permit of the slipper-pan being placed in position.

The urine passed must be carefully measured, and the amount noted on the chart. A specimen, also, should be kept for the surgeon, who may wish to examine it. The quantity of urine passed in twenty-four hours should be recorded. Under normal circumstances about fifty ounces are passed *per diem*.

Should the patient find herself unable to pass urine readily, the placing of some hot water in the bed-pan, or the application of a hot cloth or hot sponge to the vulva may be successful. In other cases, especially in hospital practice, the adoption of the simple device of surrounding the bed of the patient with screens may be all that is necessary.

If all the powers of persuasion at the command of the nurse, aided by the above-mentioned devices, are still insufficient in enabling the patient to



micturate, the catheter must be passed. This must be done with the strictest attention to asepsis. The least carelessness on the part of the nurse may result in infection of the bladder, and the cystitis thus induced may protract the convalescence and may even endanger life. The catheter must be sterilised, the hands of the nurse must be scrupulously cleansed, and the labia and vestibule of the patient must be washed carefully with an antiseptic lotion (see Chapter X.).

If the foot of the bed be elevated on blocks, these should be removed before passing the catheter; if this precaution be not observed, the nurse may encounter difficulty in emptying the bladder, and the risk of air entering the bladder is increased.

The catheter should be passed every six or eight hours, and its use is continued only till the patient is able to urinate normally.

As already mentioned, there are occasions on which it is advisable or necessary to draw off the urine periodically, by means of the catheter. After the removal of a fibroid tumour or an ovarian cyst, which has been complicated with adhesions, the straining entailed in the act of micturition may provoke hæmorrhage, and in such cases the catheter should be employed for a day or two.

In cases of *shock*, and when from other causes the sensibilities of the patient are dulled, the catheter must be passed at periodic intervals.

The failure to observe this precaution in these cases may be attended with unpleasant results. The sensation, experienced under ordinary circumstances when the bladder is full, may be unnoticed by the patient, and the bladder may be allowed to become greatly distended.

The first warning as to the real state of affairs may be given only when the patient complains of pain located in the lower abdomen and gradually increasing in intensity. This symptom, however, will be absent if the patient is unconscious or only semi-conscious. It is important to remember that in some cases, after a certain degree of distension is reached, the bladder refuses to accommodate any more urine, and the excess escapes involuntarily—the so-called “dribbling from overflow”; in this way the nurse may be deceived as to the real condition of affairs.

*When the presence of an over-distended bladder is suspected, the catheter must be passed without delay, and, where the suspicions of the nurse have been well founded, she may draw off forty or fifty ounces of urine. After this the abdominal pain and discomfort and the continual dribbling of urine disappear.*

In drawing off the urine from a distended bladder it is advisable to allow the organ to empty itself slowly. If the urine be allowed to escape quickly, the sudden decrease in the abdominal pressure may be followed by signs of collapse. Sometimes, also,

especially in cases of long-standing distension, if the bladder be rapidly emptied, the sudden release from the pressure, to which the walls have been subjected by the contained urine, may lead to rupture of some of the smaller and more superficial blood-vessels in the bladder-wall.

After the catheter has been passed, therefore, and 10 ozs. or so of urine drawn off, the index finger is placed against the open end of the catheter. After one or two minutes another 10 ozs. are removed, and this process is repeated until the bladder has been emptied.

The presence of blood in urine which has been passed naturally is not infrequently discovered after a gynaecological operation. In a large proportion of cases it indicates the onset of a false menstruation induced by the manipulation of the pelvic viscera, and especially the uterus, during the operation. The blood escapes from the uterus into the vagina, and during the act of micturition is expelled with the urine. A knowledge of this fact will often spare the nurse unnecessary anxiety and worry.

This *false menstruation* appears at different times and continues for varying lengths of time in different cases. It may begin immediately after, or within three or more days after the operation, and may continue for days, a week, or even a fortnight.

When it is discovered, a piece of sublimated wool, slightly teased out and made into a soft pad, should

be placed firmly against the external genitals to soak up the discharge. It is frequently changed, and before applying a fresh pad the parts should be gently swabbed with warm lotion.

**Care of the Bowels.**—The care of the bowels forms one of the most important items in the after-treatment of an abdominal section.

The exposure and manipulation of the intestines during an abdominal operation leads to a certain amount of temporary paralysis of the bowel, and consequently a loss of the peristaltic contractions, by means of which the intestinal contents are gradually forced along the alimentary canal to the rectum, whence they are expelled by the voluntary contraction of the abdominal muscles.

This circumstance, and the fact that any straining on the part of the patient is at first attended with pain in the wound, explains why after an abdominal section the bowels usually remain quiescent for a day or two.

The first evidence of the passing-off of this temporary paralysis of the bowel is usually afforded by the **passage of flatus**.

As the time which elapses before the bowel recovers its tone varies in different cases, the flatus, in one patient, may be passed as early as twenty-four hours after the operation, and in another patient not until the third or fourth day. A tardy recovery of the

intestinal tone is more especially found after a long, tedious operation.

*The exact time at which flatus is first passed*, and the amount passed, must be carefully noted by the nurse.

The inability of the patient to pass flatus during the first two days need not cause anxiety. If three days have passed, however, without relief, and even sooner, especially if for any reason the bowels were not properly cleared out before the operation, the patient usually begins to complain of abdominal discomfort and pain, due to the flatulent distension of the bowels. This is perhaps the most frequent source of annoyance to the patient and worry to the surgeon and nurse about the third and fourth days after the operation. As will be described in the following chapter, abdominal pain and distension are the earliest symptoms to develop in a case of peritonitis following on an abdominal operation; in the case of peritonitis, however, the pulse is more apt to be markedly quickened, and is more apt to show a steadily increasing rapidity than we find with ordinary flatulent distension. Sometimes, however, the mind of the surgeon is set at rest only when, after appropriate treatment, the abdominal pain and distension are relieved.

A convenient and practical method of estimating the amount of distension present, and a method which is unaccompanied by any disturbance to the

patient, is to pass the hand under the upper edge of the binder ; by this means we can palpate the upper abdomen without having to undo the dressings.

When the **flatulent distension** of the abdomen increases to such an extent as to cause pain and discomfort, relief may be obtained by the administration of an *enema*.

For this purpose the so-called "flatus enema" is of great value ; it consists of 1 oz. of Henry's solution,<sup>1</sup> 1 oz. of pure glycerine, and 2 ozs. of water. Consisting, as it does, of only 4 ozs. of fluid, its administration is easier than the ordinary pint or two-pint enema, and it is readily retained for a considerable time in the rectum. It is usually followed by a successful result in the course of half an hour, and to receive it when it returns all that is necessary is a pad of wool. By this means the patient is spared even the slight disturbance associated with the use of the bed-pan. Should relief not be obtained in the course of an hour, another similar enema may be given, when flatus is usually expelled in quantity.

If the "flatus enema" is insufficient, the administration of a pint and a half or two pints of soap and water may be successful.

<sup>1</sup> The formula of Henry's solution is as follows :—

Sulphate of magnesium	.	.	6 ozs.
Diluted sulphuric acid .	.	.	$\frac{1}{2}$ oz.
Distilled water, up to	.	.	12 ozs.
Dissolve.			

For the relief of the flatulent distension, so common in the first few days after an abdominal section, the *turpentine enema* is found of great service. It is conveniently given in the form of 1 oz. of turpentine with a pint of soap and water. The use of the turpentine enema must be accompanied with the greatest care. If the enema is retained for any length of time, or is only returned in part, the turpentine is liable to be absorbed by the rectum, and passing into the general circulation may give rise to symptoms of severe poisoning. It may cause a blush-like rash of the skin, and during its excretion by the kidneys it may induce an inflammation of these organs. By the passage of the irritating urine along the ureter, bladder, and urethra, severe pain and discomfort may result. The urine may contain albumen and, in severe cases, blood, and it may be scented like violets.

To prevent the development of these symptoms of poisoning, therefore, the nurse must be certain that none of the enema remains in the rectum, and to ensure this she should, after it has been expelled, give a simple warm water enema to wash the bowel clean.

When the administration of enemata fails to give relief, the introduction of the rectal *flatus tube* may be successful. The pattern shown in the figure (Fig. 87), consists of a curved glass tube with lateral perforations; it is introduced slowly and gently through the



anal orifice, with the convexity of the tube directed backwards; relief may be obtained after twenty minutes or so.

Under ordinary circumstances the bowels are opened by giving a *purgative* on the evening of the

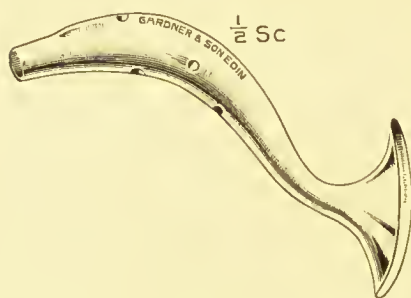


FIG. 87.—Glass Flatus Tube

third day or the early morning of the fourth day after the operation (the operation day being taken as the first day). The most reliable drug, perhaps, is castor oil given in an ounce dose. Where

this is not taken well, a saline purge or liquorice powder may be given. The bowels usually open freely on the morning of the fourth day; where the movement is not satisfactory the administration of a pint or a pint and a half soap and water enema is usually followed by a successful result.

Where there is considerable flatulent distension of the abdomen, calomel, in a 3 or 5 grs. dose, given at night, and followed by a saline purge in the morning of the next day, is found valuable.

In some cases, and especially when the removal of a tumour has necessitated the division of adhesions to bowel, it may be advisable to withhold the purgative for two or three days longer, and to trust that the administration of an enema will afford relief.

After the bowels have once been opened freely, they should be moved at least once every two days thereafter, if necessary, by means of an enema or mild purge.

**Feeding of the Patient—Feeding in Ordinary Case.**—For the *first day* nothing but occasional sips of hot water to relieve the thirst should be allowed. The giving of even the simplest article of food may provoke anæsthesia sickness, and, once started, this is difficult to arrest. As already mentioned, for extreme thirst a high rectal enema of saline allowed to flow slowly may be administered. In cases of shock and weakness a nutrient enema of beef-tea with or without the addition of an ounce of brandy may be indicated (see p. 270).

On the *second day*, if the anæsthesia sickness still continues, the same regimen should be observed. If the sickness has passed off the quantity of water may be cautiously increased, and cold water and potash water, which are usually more appreciated than the hot water, may be permitted. About two teaspoonfuls or so of milk with the same quantity of hot water or potash water should be given every hour. If milk is not taken well by the patient, the same quantity of beef-tea, or chicken-tea, or a teaspoonful of chicken jelly, may be allowed every hour.

By the *third day*, if all goes well, the milk may be

increased to 1 oz. with an equal amount of hot water or potash water every three hours, or the same quantity of thin soup or beef-tea may be given, care being taken not to administer the whole at once, but to give it from a feeding-cup in small mouthfuls at intervals.

If the laxative is given on the night of the third day or the early morning of the fourth day, the bowels will in all probability be moved in the morning of the fourth day. *Until the bowels move solid food is prohibited.*

On the *fourth day*, after the movement of the bowels, a small quantity of weak tea and a piece of buttered toast or bread-and-butter may be given for breakfast. During the day light soup, chicken- or beef-tea, chicken or beef jelly, milk-pudding, etc., may be given. Until the individual meals of the patient are more liberal, it is advisable to give some nourishment every three hours during the day, and as often during the night, if the patient is awake. It is useful to know that 4 to 6 ozs. of beef-tea, administered at night and given very hot, is helpful in promoting sleep.

On the *fifth day* the same dietary will be adopted, with the addition, if the patient is going on well, of a small piece of white fish for the mid-day meal. A little custard may be given.

It is important during the first week or so that the nurse, whilst scrupulously avoiding anything but

the lightest diet, should arrange as many changes as possible for her patient. Nothing impairs the appetite of a patient so much as monotony in diet.

A sweetbread or a small piece of chicken may be safely allowed about the *ninth or tenth day*, with a little boiled rice as a substitute for potato. An egg-flip given night and morning, if she can take it, may be found helpful in restoring the strength of the patient.

Just as a definite object is kept in view in restricting the diet in the early days of the convalescence, so in the later days food must be chosen and given with discretion in order to avoid the appearance of dyspeptic symptoms, which are sometimes very troublesome to deal with in the convalescent period. For this reason thick soups, meat, potatoes, etc., should be withheld till the *third week*, and then are only given in small quantity and judiciously increased.

**Feeding in Case with Dyspeptic Symptoms.**—A certain amount of weakness of the digestive powers is frequently encountered from the beginning, either as a manifestation of the general weakness induced by the condition from which the patient had been suffering, or as a result of the operation itself. With judicious feeding and care on the part of the nurse to mount the dietary ladder slowly, the digestive weakness improves with the general improvement in strength.

In cases of great impairment of the digestive functions even the lightest diet, such as milk and hot water, or beef-tea, etc., may not be tolerated by the stomach.

In these cases nourishment may be given in the shape of *predigested food*. Before being administered the food is transformed into a state which permits of its being almost directly absorbed by the stomach and intestine, with the result that a minimum of strain is thrown on the weakened digestive organs.

For this purpose milk peptonised by means of one of the various peptogenic powders supplied in tubes by various chemists, such as Fairchild, Armour, etc., may be found valuable. The points to be observed in the preparation of the peptonised food are fully described in printed directions supplied with the powder. Peptonised beef-tea may also be used for such patients.

The patient is fed with small quantities of the peptonised food given frequently, and this mode of feeding is continued until the digestive functions show signs of improving.

**Rectal Feeding.**—In cases of extreme digestive weakness, when the stomach cannot retain even predigested food, and in cases of intractable sickness due to the anæsthetic, it may be necessary to administer nourishment to the patient in the shape of

nutrient enemata. This mode of feeding, also, may be employed in cases of great inanition, as an adjuvant to mouth-feeding.

The **constituents of a nutrient enema** must be non-irritating. Before introduction, the enema is warmed slightly above blood-heat. A convenient and satisfactory formula is:—beef-tea, 3 to 4 ozs., or one egg beaten up, and  $\frac{1}{2}$  an oz. of cream and 2 of milk added. This may be given every four or five hours. The enema may be more readily absorbed by predigesting the food beforehand by means of a peptogenic powder, or by the addition of 3 or 4 minims of liquor pancreaticus, before introducing the enema. The ferments in this solution transform the constituents of the enema into a more absorbable condition in the rectum.

The **amount** of an enema should not exceed 4 or 5 ozs.; if a larger amount is employed the enema may be rejected. The administration of nutrient enemata must not be discontinued if the first is returned, for a tolerance is sometimes established only after one or two have been given.

If the enemata are not retained well, a diminution in the quantity to 2 or 3 ozs. may be followed by a successful result. If this fail, the nurse may, with the permission of the surgeon, add ten to fifteen drops of laudanum to one of the enemata. This enema is usually retained with ease, as also the enemata subsequently administered.

In cases of shock,  $\frac{1}{2}$  to 1 oz. of brandy may be advantageously added to the enema, and this may be repeated, if necessary, three or four hours afterwards. The use of brandy, however, must not be continued for any length of time, for it may so irritate the bowel that the retention of enemata is rendered impossible.

Before commencing rectal feeding the lower bowel should be cleansed by the administration of an enema of warm water, or boric lotion, and this should be administered once every day whilst this mode of feeding is continued. A nutrient enema should never be given till at least one hour after the cleansing enema.

The best **method of introducing** nutrient enemata is that in which the fluid is directed under gentle force into the higher part of the rectum from a funnel elevated above the level of the patient. A large rubber catheter (No. 12) is lubricated and gently passed into the rectum. A yard or so of rubber tubing, attached at its upper end to a small glass funnel, is fitted to the catheter—this is easily done through the medium of an intervening piece of glass tubing, and is facilitated if the catheter is provided with a funnel expansion at its outer end (Fig. 88).

In giving the enema the patient should not be unduly disturbed, nor need she be exposed in any way. The pillow under the knees is removed and the legs are drawn up and separated slightly. The



anus is located with the index finger of the left hand, and with the right hand the catheter is introduced

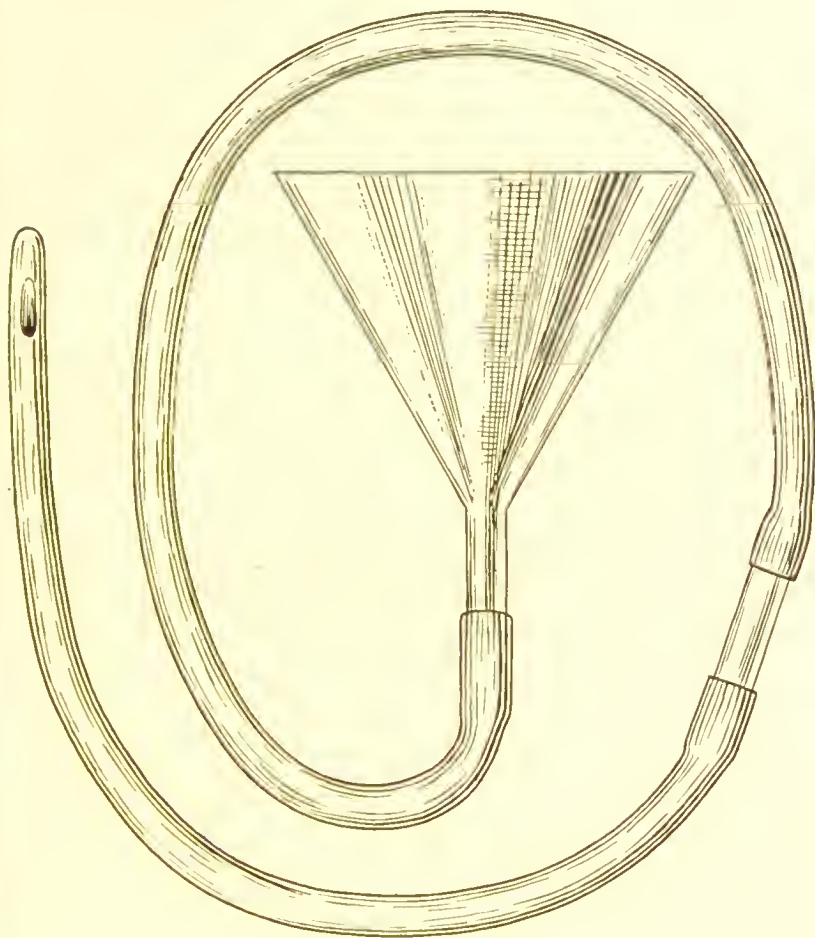


FIG. 88.—Apparatus for Administration of Nutrient Enema.

gently through the anal orifice and pushed onwards for 6 to 8 ins. Before introducing the catheter some of the enema is poured into the glass funnel

and allowed to escape from the lower end of the apparatus, thus displacing all the air. During the introduction of the catheter the fluid is prevented from escaping by nipping the tubing. The funnel should not be held more than  $2\frac{1}{2}$  or 3 ft. above the level of the bed. For ten or fifteen minutes after the introduction of the enema, and longer if necessary, the nurse should apply pressure over the anus by holding a towel or pad of cotton wool tightly against it to prevent the return of any portion of the enema.

In cases of irritability of the stomach the patient may be entirely and satisfactorily nourished by means of rectal feeding. After allowing the stomach to rest for a day or two, some light fluid food may be given by the mouth. If it does not produce nausea or vomiting, the quantity may be cautiously increased, and every alternate enema may be now replaced by some liquid food given by the mouth. The mouth-feeding is gradually increased in quantity and frequency, and the rectal feeding is proportionately diminished until the patient is receiving her entire nutriment by the natural way.

**Pain and Sleeplessness.**—As mentioned in a previous paragraph, *pain in the back* is frequently one of the most distressing symptoms complained of by the patient after the recovery of consciousness. It assumes the form of a dull ache felt

along the back, but especially located in the "small of the back." It is usually experienced from the beginning, and often increases in intensity for a day or two, in most cases passing off completely when a greater range of movement is permitted to the patient. It may be due to the disturbance of the pelvic structures during the operation, but seems also to be caused in part by the cramping of the muscles of the back. That this is a factor in the production of the pain is confirmed by the fact that relief is often given if the legs of the patient are drawn up slightly and a large firm pillow is placed behind the knees. Whilst the legs are fully extended, the back forms a slight arch, and in this position the muscles and ligaments are slightly on the stretch; this produces the gradually increasing pain complained of by the patient. By means of the pillow the limbs are flexed slightly on the abdomen, and the back is allowed to lie flush on the bed with a consequent relaxation of the muscular and ligamentous structures.

By this device, also, *pain in the wound* may be appreciably relieved. By the elevation of the limbs the abdominal wall is allowed to assume a state of greater relaxation than when the legs are extended, and any traction on the stitches is thereby diminished.

As described above, pain in the wound during an attack of anæsthesia vomiting is relieved by

supporting the abdominal wall during the act of retching.

Pain and discomfort in the wound which develop three or four days after the operation usually indicate the onset of an inflammatory condition. It may be associated with a rise of a degree or two in the temperature. Its treatment is discussed in the paragraph on the Abdominal Wound.

After an abdominal operation *pain in the abdomen and pelvis* is usually experienced and the patient is often able to locate it only vaguely. In other cases it is situated in one or both sides, or in the back.

The *treatment of pain* after abdominal section depends on the nature and causation of the pain. In some cases it is relieved by the simple device of placing a pillow under the knees. If due to flatulent distension of the bowels it is treated by the methods described in a preceding paragraph (p. 262). Where deeply seated its treatment is more difficult. A certain amount of pain must be expected after an abdominal section, and moral suasion may be sufficient to soothe the patient, especially if she be of a nervous temperament. If the pain is severe the administration of morphia may be ordered by the surgeon. The most certain method of administering morphia is by hypodermic injection —  $\frac{1}{12}$  gr. is often sufficient to dispel the pain. It may be repeated in a similar dose if necessary an

hour afterwards. If given in the form of a suppository  $\frac{1}{3}$  gr. may be sufficient. It is important to remember that small doses of morphia are often quite successful in affording relief. Morphia is to be avoided as a routine, especially in larger doses, because of the fact that it masks the true condition of the patient, and in addition tends to lead to peresis or paralysis of the bowel.

*Sleeplessness.*—If possible the patient should have a sleep on the night following the operation. A natural sleep is often obtained; even if of a fitful nature it is helpful. If the patient is restless and sleepless veronal or trional in a 10-gr. dose may suffice; if the want of sleep is due to pain a hypodermic administration of morphia is especially efficacious.

**Care of the Skin.**—Great comfort is derived from a daily sponging of the extremities and as much of the body as is possible without unduly disturbing the patient or moving the dressings and adhesive plaster over the wound. The binder, if one is used, is removed twice daily and the back and hips are washed with soap and water, carefully dried and then rubbed well with methylated spirit.

If the patient is emaciated the greatest care must be taken with her back, and if the slightest redness is seen she should at once be placed on

an inflated rubber ring cushion. This should be covered by a bandage of soft calico or some such material, which is wound round and round the ring. It should be placed *directly* beneath the patient, lying above the mackintosh and draw-sheet. In this way only can the bony prominences be satisfactorily protected from undue pressure.

In these cases, if possible, a binder should be dispensed with, as it tends to still further irritate the skin.

If the patient has been bedridden for some time before the operation, and her back and shoulders show signs of redness, it is advisable to place her on a water-bed on her return from the operating room.

**The Abdominal Wound.**—If all goes well, the wound may be left undisturbed for seven to ten days. If the skin edges have been apposed by means of a subcutaneous catgut stitch, after performing its duty the catgut is absorbed by the tissues. Where horse-hair or silkworm-gut has been used the stitches require to be removed after the union of the edges of the wound has taken place—the removal is usually carried out about ten or twelve days after the operation.

The nurse should see that the patient's bowels are moved on the morning of the day arranged by the surgeon for the removal of the stitches. The



following articles should be in readiness for the **removal of the stitches**:—one pair of dissecting forceps, one pair of sharp-pointed scissors, a mackintosh, two sterilised towels, several sterile swabs, sterilised iodoform gauze and cotton wool, warm carbolic lotion (1-60) or corrosive lotion (1-4000), adhesive plaster, and, if such is used, a binder. The forceps and scissors are sterilised by boiling, and are carried to the bedside of the patient in some warm carbolic lotion.

The bedclothes, with the exception of the sheet, are folded well down towards the foot of the bed, to be out of the way of the surgeon. The sheet is folded over at the level of the pubis, and covers the pubis and thighs of the patient. The binder is now unfastened and removed by the nurse, as also the cotton wool over the dressing. The mackintosh is placed over the covering sheet and is tucked under it at the level of the pubis; it is then covered with a sterilised towel. The gown of the patient, which has previously been rolled up over her chest, is likewise covered with a sterilised towel.

When there has been little or no oozing of blood from the wound, the surgeon is usually able to remove the gauze dressing easily; if there has been oozing, however, this usually hardens on the dressing, and, to prevent pain during its removal, it requires to be softened by some warm antiseptic lotion.

If the wound be a small one all the stitches are



usually removed at the one dressing; if large, and especially if it shows evidence of weakness, the surgeon may, for security, leave some of the stitches for a few days longer.

After the removal of the stitches a safe practice as a routine, and one which is essential if the wound show signs of insecure union, is the application of strips of adhesive plaster. Strips of convenient length (about 6 or 8 ins.) and about 1 in. wide are sterilised before being applied by drawing them rapidly backwards and forwards two or three times in the flame of a spirit lamp. Before applying the plaster, a narrow strip of sterile gauze is placed over the wound, and the sides of the abdomen pressed firmly inwards towards the middle line. The pressure is kept up till the strapping is securely fixed.

The wound is now dressed with the ordinary gauze dressing, which is covered by several layers of cotton wool, and the whole is secured by means of two or three broad strips of adhesive plaster.

Under ordinary circumstances the wound need not again be attended to for four or five days, when a change of the dressings is often appreciated by the patient. The patient may complain of pain in the removal of the strapping, especially in the case of the strip in the region of the pubis, where the hairs have probably grown under the plaster. If the adhesive material of the strapping adheres to the skin a little

ether is required for its removal. If, after the removal of the plaster, the skin is found to be excoriated, the application of a small piece of zinc-ichthyol muslin quickly promotes healing.

In the large majority of cases, where the skin has been carefully prepared beforehand, where the instruments and sutures are thoroughly sterilised, and where the strictest aseptic precautions are observed during the operation, the wound heals by first intention. In rare cases, however, even after the observance of the greatest care, an **inflammatory condition** may develop in connection with the wound. When this sets in, which is, in a large number of cases, about the fourth or fifth day, the patient complains of pain and irritation in the wound, usually accompanied by a rise of a degree or so in the temperature. In such a case the dressings should be removed for the inspection of the wound. It should be remembered, however, that the same symptoms may be due to flatulent distension of the bowels, with a consequent stretching of the wound. If the fears of the surgeon are realised, inspection of the wound reveals the presence of inflammatory redness round one or more of the stitches. The origin of this inflammation in such a case depends upon the fact that even the most careful preparation may fail to destroy the organisms in the deeper layers of the skin; the presence of the stitch may stir them into activity, with the production of an inflammatory

process which spreads along the track of the stitch.

The presence of inflammation in the track of a stitch renders its removal imperative; if allowed to remain, the continued irritation may carry the inflammation to the formation of a **stitch abscess**. This in its turn may lead to infection of the neighbouring parts of the wound. If the presence of inflammation in a wound be undetected in the early stages, when the dressings are removed the septic mischief may be found to have proceeded to the extent of a localised or a wholesale breaking-down of the wound.

If it is necessary to remove the stitches before the wound is firmly united, the application of strips of sterilised plaster, as described above, is sufficient to hold the edges in contact.

The presence of inflammation in a wound, in addition to causing pain and subjecting the patient to the discomfort of frequent dressing, may protract the convalescence materially. It often results in a weak scar which is apt subsequently to become stretched and allow of the hernial protrusion of the bowels.

A patient who has made a good recovery from the operation is allowed to sit up in bed on the twelfth day, and a few days later, with the surgeon's permission, may be allowed to get up.

In the large majority of cases, the patient, before getting out of bed, should be provided with a well-

fitting **abdominal belt**, which she must be instructed to wear constantly during the day for at least a year. In patients who are inclined to be stout, and in the case of women whose everyday duties necessitate physical exertion, this is most important.

A satisfactory pattern is represented in the figure (Fig. 89). The most important part of the belt is

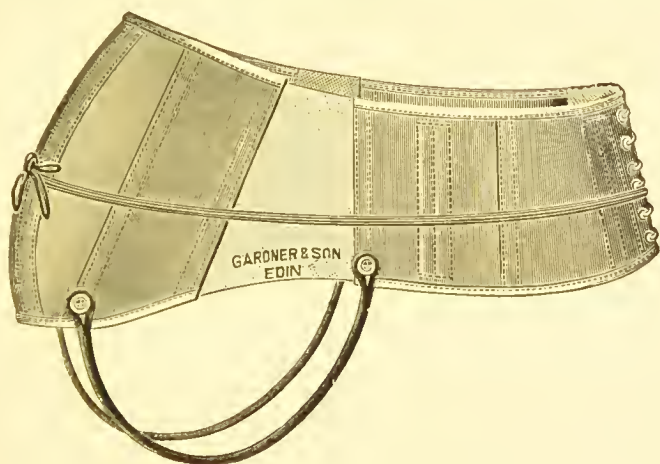


FIG. 89.—Abdominal Belt.

the pad. This should be large, flat, and firm, and made of some material which is resistant, but, at the same time, as light as possible. Padded cork is most commonly used, but, in the case of a long incision, a very reliable and light pad may be made of aluminium, padded on the surface which lies next the scar.

To retain the belt in position and prevent the tendency to slip upwards, under-straps of rubber

tubing or chamois leather are supplied. These are fixed to the belt in front and behind, and do not chafe the skin.

The pressure of the belt is regulated by the lacing at the back.

The measuring of a patient for a belt should be left to one who has had some experience in the work, and should not be undertaken by a nurse, unless under special circumstances, when instructions for the proper measurements will be sent to her by the maker.

The reason for the necessity of a belt is that there is a tendency for the scar to yield from the constant abdominal pressure, with the production of a **ventral hernia**. This tendency is especially found in those cases where the abdominal walls have been greatly stretched and thinned out, and have lost to a great extent their muscular power. Such a hernia, besides being a source of great discomfort, is, if it remain unreduced, a constant danger to life.

From a variety of causes, as, for example, the sudden forcing into the hernial sac of more bowel than it can safely accommodate, the coils of intestine may pass into a condition of strangulation. By this is meant obstruction of the blood-vessels of the bowel, at first the veins and latterly the arteries. The bowel becomes congested, inflamed, and ultimately paralysed. The condition of strangulation passes rapidly into the condition of paralysis, with

the production of the symptoms of obstruction of the bowels. Unless promptly operated on, the patient may succumb to the severity of the symptoms.

Before the nurse adjusts the belt to her patient for the first time, preparatory to allowing her to rise, she must cleanse the skin of the abdomen, removing from it by means of a little ether, all detached flakes of epidermis, and any material which remains from the application of the plaster used for strapping the wound.

A patient, when allowed out of bed for the first time, must not be expected to be strong enough to walk. For the first few days she should be assisted either to a couch or to an easy chair. Gradually strength is regained and less and less support is required, so that in a few days she is able to walk without help. After this convalescence is rapid, and such patients are, within three or four weeks, able to return home after operation in a state which allows them to attend to their lighter household duties within a very short time.

It must not be understood that all cases of abdominal section are allowed out of bed at the end of two weeks. Where complications are encountered during the operation or arise during the convalescence, it may be necessary to keep the patient in bed for a longer period.

## CHAPTER XXV

### COMPLICATIONS AFTER ABDOMINAL SECTION

SHOCK, anæsthesia sickness, and severe abdominal distension must be classed as post-operative complications. As, however, one or more of these conditions is encountered in greater or less degree in practically every case after abdominal section, it was thought advisable to include their consideration in the chapter on after-treatment.

The complications which remain to be discussed in this chapter are hæmorrhage and septic infection.

### HÆMORRHAGE

This is one of the most dreaded of the complications after abdominal section. Owing to great improvement in the technique of abdominal operations, it is fortunately, nowadays, a complication of rare occurrence.

In the large proportion of cases hæmorrhage after an abdominal section occurs on the first or



second day. It may originate in two different ways. In the first place, the blood may be poured out from the divided end or ends of one or more smaller vessels which have escaped detection during the operation. The circulation of the blood, which has been weakened as the result of the strain of the operation, rapidly improves when the patient is removed to bed and heated up with warm bottles. The increased force of the blood-flow may result in a detaching of the clots, which have formed in the open ends of the vessels, and the blood is poured out into the neighbouring region.

In the second place, the hæmorrhage may be due to the slipping of a ligature round a vessel of larger size, as the result of the increased force of the heart-beat or the straining associated with the retching of anæsthesia sickness.

The signs and symptoms of internal hæmorrhage vary greatly according to the condition present. If the leak be from a small vessel the symptoms develop insidiously, and may escape recognition for some time; when the hæmorrhage is from a large vessel, on the other hand, the patient rapidly sinks into a state of collapse, and unless the abdominal wound be re-opened without delay, and the bleeding vessel sought for and ligatured, she may succumb from the loss of blood.

As already mentioned, for some time after an abdominal operation there must be a nurse in

constant attendance on the patient. When she leaves the room in which the patient lies, she must be relieved by another nurse. The nurse must be ready to lend her help in an attack of anæsthesia sickness, and in the treatment of shock, and she must be constantly on the watch for any signs indicating the occurrence of internal hæmorrhage.

**Signs and Symptoms of Internal Hæmorrhage.—**

Where a drainage tube or gauze drain has been introduced into the abdominal wound or through the vaginal roof, the nurse must frequently examine the binder or the vulvar pad, and the escape of an excessive quantity of blood gives direct evidence of internal hæmorrhage. When this is discovered, the surgeon should be immediately apprised of its occurrence. In other cases the nurse has to trust to more indirect means of detecting the presence of internal hæmorrhage, and she should be familiar with the signs and symptoms which indicate its occurrence.

The earliest indication of internal hæmorrhage is found in an increase in the rate of the **Pulse**. With the continued escape of blood the rapidity steadily increases, slowly in the case of a small leak, rapidly when the hæmorrhage is from a large vessel. With the increase in the rate, the pulse becomes smaller and feebler and, after profuse hæmorrhage, may become so faint that it is imperceptible at the

wrist. In this case it may still be counted in the large vessels of the neck.

With the increase in the rate of the heart-beat after a severe loss of blood there is noticed a marked **Pallor** of the face and lips, and a clammy perspiration often appears on the skin of the forehead. Pallor of the face and lips is usually seen in the case of shock, but after a severe hæmorrhage the blanching is more extreme.

With the onset of hæmorrhage the patient may complain of a feeling of sickness, and the nurse may at first mistake the condition for the impending occurrence of an attack of anæsthesia sickness. The behaviour of the pulse, however, affords a means of differentiating between the two conditions. If the pulse is carefully examined it will be noticed that, before an attack of vomiting, it becomes suddenly more rapid and more difficult to feel, and the patient at the same time volunteers the statement that she is going to be sick. A short time after the vomiting is over, if the pulse be again examined, it will be noted to have regained its strength and previous rate. In the case of hæmorrhage, on the other hand, the pulse-beat becomes more rapid and more feeble from minute to minute.

With the continuance of the hæmorrhage the patient complains of an increasing thirst, and early complains of a feeling of **Faintness** and dizziness. There may be a sensation of chilliness, and after

a severe hæmorrhage the thermometer may register a temperature a degree or two below normal.

If the hæmorrhage continue unchecked, the above-mentioned signs and symptoms become exaggerated, the respirations become rapid and sighing in character, and the patient cries out for air. The patient begins to hear noises in the ears, the sight becomes dim, and when spoken to she is found to be slightly deaf. A marked sign is restlessness, which becomes gradually worse and more difficult to control; the patient tosses her arms and legs about, and may endeavour to get out of bed. The patient becomes extremely listless, the voice becomes weak, and she sinks into a state of extreme **Collapse**. The breathing becomes more and more laboured and gasping, unconsciousness supervenes, and the patient ultimately dies.

**Treatment of Hæmorrhage.**—The nurse in attendance in a case of abdominal section must keep a constant guard over the patient; she must frequently examine the pulse and note the appearance of the face of the patient, and, on the development of the symptoms associated with internal hæmorrhage, she must immediately send for the surgeon in charge.

Pending the surgeon's arrival, the pillows under the head of the patient should be removed, and the foot of the bed raised by two bed-blocks; by this means the flow of blood to the heart from the lower

limbs and abdomen is encouraged, and the flagging circulation is thus stimulated.

The apparatus for the submammary or intravenous transfusion of saline solution should be sterilised (Fig. 83, page 212), and 3 or 4 pints of sterilised saline at a temperature of  $103^{\circ}$  or  $105^{\circ}$  Fahr. should be in readiness. The instruments required by the surgeon for opening the abdomen, and the necessary ligatures and sutures, must be prepared.

At this point a word of warning must be uttered regarding the question of the administration of stimulants to a patient suffering from hæmorrhage. After a large loss of blood the patient becomes faint. This faintness is associated with a still further diminution in the force of the heart-beat, already reduced by the escape of blood. As the result of this weakening of the force with which the blood circulates in the vessels, the bleeding is reduced in amount and may entirely cease. Under these circumstances the administration of stimulants may be followed by disastrous consequences, because, by strengthening the heart-beat, it increases the force of the circulating blood, and, by detaching the clots which have formed in the open end of the divided vessel, it leads to a renewal of the hæmorrhage.

The administration of stimulants is usually withheld in a case of hæmorrhage, except in the event of grave collapse where the heart must at any cost be stirred into activity.

## SEPSIS AFTER ABDOMINAL SECTION

The symptoms and treatment of *infection of the wound* have been discussed in the previous chapter (p. 279).

There falls to be considered in this chapter septic infection of the tissues of the pelvic cavity. This complication is fortunately rare, and its occurrence in a case free from infection before the operation casts reflection on the efficiency of the aseptic procedure adopted before and during the operation. Where the operation is performed for the removal of a tumour, etc., which is the seat of organismal infection, the peritoneal cavity may be accidentally contaminated.

It is convenient to consider pelvic infection after a gynæcological major operation under two headings. In the first place, if the organisms introduced are not very virulent, and the tissues of the patient are resistant, the inflammation induced by the infection remains localised. In the second place, the organisms may be so virulent, or the vitality of the patient may be so lowered, that the results of the infection are from the beginning extremely grave.

**Milder Forms of Pelvic Infection.**—In this form of infection the condition, though it may give rise to considerable anxiety, does not assume the rapidly dangerous characters associated with the second class

of case. It should be noted, however, that a septic infection of the pelvis of the milder type may at any moment take on more dangerous characters.

The infection may originate in a variety of ways—it may result from improper care of the hands, instruments, etc., or it may occur from the exposure of infective surfaces during the operation. The stump of the cervix left after the removal of the body of the uterus for fibroid tumour is a not infrequent source of such infection.

The inflammation induced by the presence of the organisms may subside after a day or two, or it may proceed to the length of suppuration, when the abscess is localised by the formation of adhesions round it.

**Signs and Symptoms.**—The most important indication of septic infection is found in the rate of the pulse—a pulse of 100 twenty-four hours after operation is suspicious, especially if it shows a tendency to increase.

The **temperature** is not so reliable a guide as the rate of the pulse. In the majority of cases of localised pelvic inflammation the temperature chart registers a swinging line several degrees above normal, the maximum being about  $101^{\circ}$  or  $102^{\circ}$ . In some cases the temperature fluctuations are more marked, and rigors or shiverings may be present. During a rigor the thermometer registers a sudden rise in tempera-



ture to  $104^{\circ}$ ,  $105^{\circ}$ , or even higher. After the rigor the temperature drops suddenly, and the patient breaks out into a profuse perspiration.

Another symptom of pelvic infection is the presence of severe **pain** in the lower abdominal region ; it is more or less constant and is aggravated by pressure. There may be pain on micturition and during the movement of the bowels. There is usually constipation, but there may be diarrhœa.

The patient looks worried and anxious, the face is pale as a rule, though there may be flushing of the cheeks. The appetite is impaired, and there may be nausea and vomiting. There is sleeplessness, and the patient loses flesh from day to day.

Examination of the blood by the surgeon reveals the presence of a marked increase in the leucocytes or white blood-corpuscles. The proportion, which is about 8000 (per c.mm.) in health, may be increased to 20,000, 30,000, or higher. The presence of a marked **leucocytosis** is suggestive of the formation of pus.

When an **abscess** forms, the symptoms may become aggravated. The temperature may assume the "hectic" type, rising to  $104^{\circ}$  or  $105^{\circ}$  at night, and sinking to normal or below normal in the morning. Rigors and sweatings are then more typically found, and the patient emaciates rapidly.

The abscess may burrow in various directions—in some cases it works towards the wound where it

evacuates itself or is evacuated by the surgeon, with a marked improvement in the symptoms. In other cases vaginal examination reveals the presence of a cystic swelling of pus in relation to the vaginal roof; the abscess may burst through in this region or may be evacuated by the surgeon. In still other cases the pus may find its way into the bladder or the rectum. The nurse must accordingly carefully examine the urine and the stools in such a case.

**Treatment.**—To allay the fever sponging of the limbs with tepid water is found beneficial, and it affords the patient a sense of comfort. The patient should wear a flannel nightgown, which is replaced by a fresh one when it becomes wet with perspiration.

For the relief of abdominal pain the application of the ice-bag may be found serviceable. The bag is partly filled with small pieces of ice, the air is expressed, and the lid is screwed on tightly. The ice-bag is of little use if applied over several layers of wool. This should be removed and the immediate dressings covered by a large square of prepared gutta-percha tissue (see p. 313). This prevents infection of the wound, and, being waterproof, protects the dressings from any water which may ooze from the ice-bag. The layers of wool are now replaced and the binder is fixed loosely over all.

During the fever the diet of the patient should be limited to fluid articles, such as milk, alone or with

potash, and light nourishing soups. If these are refused by the stomach, peptonised milk may be tolerated. In cases of intractable vomiting it will be necessary to administer nourishment by the rectum.

The bowels of the patient in an ordinary case should be moved freely every day by means of a saline purgative if necessary. The administration of purgatives must be judiciously carried out, especially in a patient who is much reduced. In these cases excessive depletion of the patient is to be avoided.

Stimulants in the shape of brandy, whisky, champagne, strychnine, etc., may be ordered by the surgeon. The hours at which they are administered must be noted by the nurse and carefully recorded on the chart.

If the surgeon evacuates an abscess through the abdominal wound, he will introduce a drainage tube through which the purulent matter may escape as it is formed. In such a case the wound will require dressing once or twice every day. During the process care must be taken to avoid contaminating the hands with the purulent discharge, which is frequently of a highly infective nature. Rubber gloves are used. If these are unavailable, the soiled dressings and drainage tube are removed by means of forceps and not with the fingers, and in expressing the discharge and washing the wound, fairly large swabs of cotton wool are used. As soon as the swabs are contaminated they are thrown away, care

being taken to prevent the fingers from touching the infected surfaces. After the pent-up discharge has been removed the drainage tube, which has been cleansed in a solution of strong lysol, is replaced, and the wound is covered with gauze soaked in carbolic lotion (1-60) or corrosive lotion (1-3000). A very satisfactory antiseptic for the dressing of septic cases is ichthyol (10 per cent).

After the evacuation and drainage of an abscess the symptoms of the patient usually improve rapidly—the temperature and pulse sink to normal, the sweatings disappear, the appetite is restored, and the patient quickly regains her lost flesh.

As the discharge lessens in amount the drainage tube is gradually shortened and is ultimately removed. The wound thereafter usually heals up quickly.

If the abscess is evacuated from the vagina the surgeon will in all probability introduce a rubber drainage tube through the opening made in the vaginal roof. A self-retaining drainage tube may be conveniently made in the manner represented in the figure (Fig. 90). Two lateral flaps are made at the end of the tubing by cutting out two narrow strips of the rubber. A hole is cut in the tube at the base of each of the flaps, which are turned in and pulled through on each side.

In cases of vaginal drainage a warm antiseptic douche is given night and morning. The tubing is

left in position till the discharge almost entirely disappears.

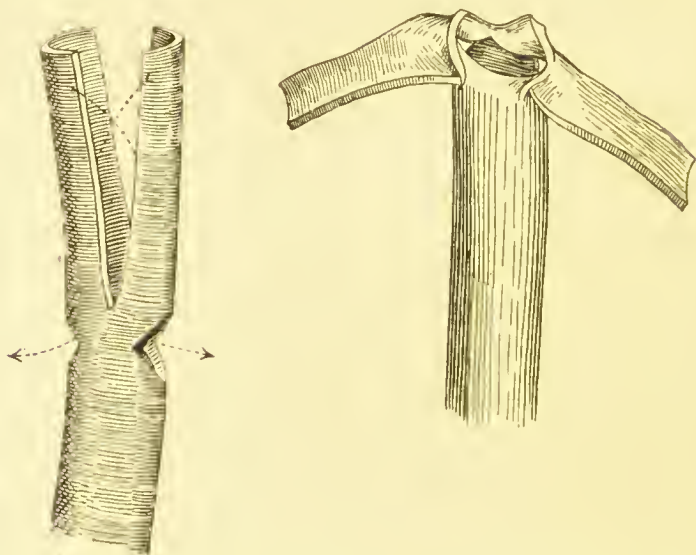


FIG. 90.—Method of making Self-retaining Drainage Tube.

**Severe Forms of Pelvic Infection.**—Under this heading it is intended to include those acute cases where the patient is early overwhelmed by the virulence of the toxins produced by the organisms. From the malignant nature of the organisms, which are in the large majority of cases streptococci, or from the lowered vitality of the patient there is not the same tendency here, as is found in the cases of milder infection already described, to the formation of protective adhesions, by means of which the inflammatory process is localised and the purulent matter is encysted to form an abscess. These con-

ditions usually start as an acute pelvic peritonitis, but the peritoneum of the general abdominal cavity may be early involved.

**Signs and Symptoms.**—The condition may develop within twenty-four hours, and in these cases the outlook is usually extremely gloomy. In the majority of cases the symptoms first appear from the third to the fifth day.

*As in every acute abdominal condition, the pulse is the best index of the patient's state.*—In these acute cases it rapidly mounts to 110 or 120. It is at first full and bounding, but after a time it becomes small and thready. A pulse of 130 or 140 renders the outlook extremely grave. A clinical fact of importance in connection with septic peritonitis is the fact that the rate of the pulse mounts steadily from hour to hour.

The **temperature** is not such a reliable gauge of the patient's condition. In some cases it pursues a swinging course several degrees above the normal line, in other cases it is only slightly raised above the normal. In many of the worst cases, proving fatal within thirty-six or forty-eight hours, the temperature sinks to subnormal—perhaps 96° or 97° Fahr. In these cases, in which there is a rapid absorption of the poisonous organismal products or toxins, the patient is quickly reduced to a state of collapse. In this class of case, also, rigors are rarely found.

The *face* of the patient becomes pinched and anxious looking, with staring eyes—the so-called “**abdominal facies.**” The skin assumes a sallow hue, and the patient, although looking extremely ill, is often quite unaware of the gravity of the condition, and may volunteer the statement that she is feeling well.

**Pain in the abdomen** is usually a prominent sign throughout the progress of the condition; in some cases, however, it should be remembered that this symptom may be insignificant or even absent. Because of the inflammation of the underlying peritoneum, the respiratory movements of the abdominal wall are diminished or absent, and palpation reveals the presence of acute tenderness. The pain and tenderness may at the beginning be localised in the lower abdominal region, just above the pubis or to one or other side, but in a case of severe septic peritonitis it early becomes diffused over the entire abdomen.

With the pain there is restlessness, and loss of sleep, and a rapid loss of flesh.

One of the earliest symptoms to appear in a case of acute septic peritonitis is **Vomiting.** In the early stages this may be mistaken for a prolongation of the anæsthesia sickness, in other cases it may resemble a reappearance of such sickness. The vomiting, however, differs markedly in nature from that found in the sickness due to the anæsthetic.



There is in a case of septic peritonitis absence of the well-marked nausea, and the patient without effort eructates frequent small quantities of fluid from the stomach. Though at each act only a small amount of fluid is brought up, the total quantity in twenty-four hours is large, and constitutes a serious drain on the system of the patient. The vomiting is at first the stomach contents and bile, but later on the contents of the intestines from a lower level are brought up. After a time the vomit is frequently stained brown from admixture with altered blood, and often possesses an extremely offensive odour.

The **State of the Bowels** is of extreme importance in a case of septic peritonitis. In the large proportion of cases the bowels are paralysed from the onset of the condition, though in some cases the irritation due to the inflammatory process may cause diarrhœa in the early stages.

As already mentioned in the chapter on the After-treatment of Abdominal Section, the patient in a normal case usually passes flatus for the first time within forty-eight hours after operation. *Inability to pass flatus* within two or three days arouses suspicion, especially if at the same time the pulse shows an increased rate and enema after enema fails to restore the functions of the bowel.

As the result of the inability to empty the bowel, *distension of the abdomen* appears. This usually appears after a day or two, and is due to decompo-

sition of the retained intestinal contents with consequent gaseous distension of the coils of bowel.

With the continuation of these symptoms the strength of the patient rapidly fails, the pulse becomes more and more rapid, with a steadily increasing diminution in the strength of its beat, until at last it becomes imperceptible. The limbs, the nose, and the ears become cold, and the forehead is covered with a clammy sweat. Though some patients remain conscious almost to the end, many pass into an unconscious state several hours before death.

**Treatment.**—In a large number of cases treatment is unavailing. As soon as septic infection of the pelvic cavity is definitely recognised, the surgeon may open up the abdominal wound and flush the part with warm saline lotion; to provide for drainage, a glass tube is passed down to the Pouch of Douglas. To procure more efficient drainage the head of the patient's bed may be elevated on bed-blocks; in this way the purulent material, as it is formed, gravitates to the pelvis, whence it is discharged along the drainage tube.

Where the patient can retain food, light nourishing soups or milk may be given. To replace the fluid lost by the continual vomiting, the patient may be allowed large quantities of water or potash water by the mouth. In most cases, however, it is necessary

to nourish the patient by means of rectal feeding, and to administer the required fluid by means of enemata of saline solution.

The administration of stimulants may be carried out by means of the rectal route, or by means of hypodermic injection.

To control and diminish the effects of the organismal infection, anti-streptococcic serum may be valuable, given in the prescribed doses.

To relieve the pain the administration of morphia may be necessary—in the form of a suppository ( $\frac{1}{4}$  to  $\frac{1}{2}$  gr.) or hypodermically ( $\frac{1}{6}$  to  $\frac{1}{3}$  gr.). The use of morphia is withheld as long as possible, because of the tendency it possesses to increase the paralysis of the bowel already present.

## CHAPTER XXVI

### DESCRIPTION AND PREPARATION OF OPERATING GOWNS, SHEETS, SWABS, SPONGES, ETC.

A SURGEON'S **operating gown** should be made of linen or holland, one of the best patterns being that of a child's overall. It should reach from the neck to the ankles, and should be provided with a band round the waist. The sleeves should be long, and should be provided with tapes to fasten them tightly round the wrists, so that rubber gloves, if used, can be drawn over the ends of the sleeves.

**Caps** for operator and assistants are made of linen, and of the pattern of a smoking-cap, and should cover the whole head closely.

**Masks** should be 5 ins. square, and may be made of four folds of white gauze or two of butter muslin with the edges turned in and stitched; they should be taped at two corners. This will be found quite large enough to completely cover the mouth and nose. The tapes are brought over the tops of the ears and tied at the back of the head.

A length of folded gauze tied round the lower part of the face will serve the same purpose, but is not so comfortable as the small gauze square.

All these articles—the gown neatly folded, the gloves, cap, and mask—should be made into a packet in a small hemmed square of unbleached calico. This is folded tightly over them, pinned, and the name of the wearer plainly written on the parcel in skin pencil. They are then sterilised by steam, and when the operators are ready for them, each parcel is opened by the nurse, who should be ready to button the gowns at the back, to tie the tapes at the wrists, and to fix the masks over the face of the surgeon and assistants.

A **nurse's overall** is made of the same pattern as that of the surgeon.

A very useful **nurse's cap** may be made from a piece of thin muslin or of butter muslin three-quarters of a yard square, and hemmed all round. A length of 8 ins. is drawn up at either side by pieces of tape run through the hems, and these tapes are also used to tie on the cap (see Figs. 91 and 92). This style of cap covers the hair, and is so light that it can be worn with comfort. Nurses' gowns, etc., should be rolled into a parcel before being sterilised, having the names of the articles written on it.

A **patient's cap** is made of linen or calico, and in the shape of a snob cap. Half a yard of calico is

cut into a round, and sewed on to a band,  $1\frac{1}{2}$  ins. wide and 25 ins. long. Through the band a piece

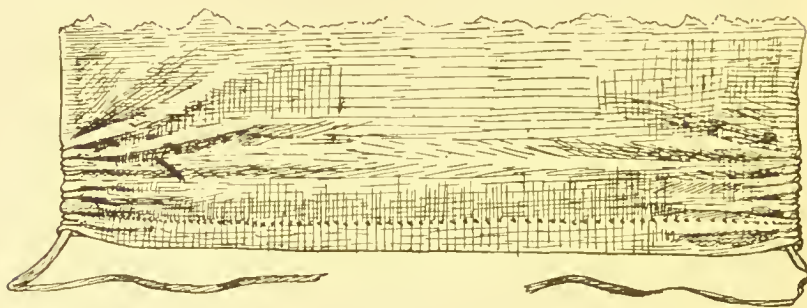


FIG. 91.—Nurse's Cap, showing how it is drawn up by Tapes.

of tape is run, which, when the cap is on, can be drawn tightly and tied at the nape of the neck.



FIG. 92.—Nurse's Cap, showing Method of fastening on Cap.

**Stockings.**—The best and warmest stockings for use during operation are those knitted of thick, white wool, but when such are not available, flannel stockings are quite useful, made in the shape of an ordinary stocking. Either should be of a large size, and long enough to reach half-way up the thigh.

**Covering stockings** for use in the *dorsal posture* are made of linen or calico, and of the same shape as an ordinary stocking. They must, of course, be large enough to slip over and completely cover the woollen stockings. They are sterilised before being used.

Covering stockings for use in the *lithotomy posture* are made of 1 yd. of calico doubled from corner to corner, and sewed along one side. The part for the toes may be improved in appearance by being rounded instead of ending in a sharp point. After the patient's legs have been fixed to the leg-rests, these coverings, which have previously been sterilised, are slipped over legs and rests.

A **laparotomy sheet** is made of linen or huckaback, and is 2 yds. square. In the middle line, and  $\frac{1}{2}$  a yd. from the top end, a slit is made of 10 to 12 ins. in length. The sheet when in place will entirely cover the patient from neck to feet. The slit, of course, corresponds to the part where the incision is to be made.

A **lithotomy sheet** is made of calico, and is  $1\frac{3}{4}$  to 2 yds. square; exactly in the middle it is provided with a slit, 8 ins. long, with a transverse slit of 14 or 15 ins. on either side, and at a distance of about 8 ins. from the central slit. Through the transverse openings the sheet is slipped over the covered legs and leg-rests, and through the opening at the middle line the vulva is exposed. The upper



half of the sheet covers the patient's body, while the lower half covers the buttocks, and is draped into the receiving vessel at the foot of the table (see Plate II., page 178). The sheets with all the other requisites for the covering of the patient—stockings, towels, etc.—should be done up in packets, as already described. The names of the articles enclosed, or the operation for which they are to be used, are written plainly on each packet before it is sterilised. By adopting this method, the various articles are kept free from contamination by unnecessary handling, and are easily recognised by the nurse when wanted.

**Swabs** and **pads** may be made in different ways and of different materials. Perhaps the best and most convenient for gynæcological work, and especially for abdominal work, are those made of butter muslin. This material costs  $2\frac{1}{4}$ d. a yd., and is strong enough to stand washing and sterilising many times. Swabs of this muslin should be made in three or four sizes. Those for ordinary use—for wiping wet surfaces, etc., should be  $\frac{1}{2}$  a yd. square, and hemmed all round. Those used for packing off the intestines, etc., in abdominal work should be 1 yd. long and  $\frac{1}{2}$  a yd. wide, while those for the same use in very extensive operations, such as large fibroid or ovarian tumours, should be 1 yd. square. Each packing swab should be hemmed as above, and in addition should have

6 ins. of tape attached to one corner. To this tape a pair of forceps will be attached before handing the swab to the surgeon.

Very small swabs, 8 or 9 ins. square, and hemmed in the same way, are useful, when grasped by long forceps, for sponging up blood, etc., deep in the pelvic cavity.

All these different sizes of swabs should be folded neatly and put up in packets of five or ten. Each packet is then put into a small bag, and the size of the swabs written on each bag—"small," "medium," "large," or "handle," as the case may be—and they are then sterilised.

Pads and swabs, instead of being made of butter muslin, may be made of white gauze.

Pads for use in the abdominal cavity may be made of a square yard of gauze, folded six times lengthwise, the raw edges being turned in and stitched. Smaller pads of  $\frac{1}{2}$  a yd. of gauze are made in the same way. Each should have 6 ins. of tape attached to one end.

Gauze swabs may be made 4, 6, or 8 ins. square of several folds of gauze arranged so that all the raw edges are inside. The smaller sizes are useful for swabbing out the pelvic cavity, and for this purpose are grasped with long forceps. Gauze can be washed and sterilised several times, but is not nearly so durable as butter muslin.

**Abdominal squares** used for covering the abdo-

men after it has been cleansed prior to operation may be made of four folds of butter muslin  $\frac{1}{2}$  a yd. square, or a soft towel doubled will answer the same purpose. Either will, of course, be sterilised before use.

To **cleanse swabs**, etc., made of butter muslin or gauze, they should be soaked in cold water as soon after use as possible, then washed in a solution of lysol till all the blood-stains are removed. After this they are boiled for half an hour or more and rinsed out of tepid water. When half dry they should be stretched and folded on a table. By so doing the creases can all be removed, and the swabs look as if they had been ironed. The drying process is then completed, and they are put away in packets ready for re-sterilisation.

**Sea sponges** are now but rarely used in surgical work. As they are, however, occasionally employed, it is advisable to describe in this chapter a method of preparing them. Sponges of the best quality only should be selected, each one being examined to see that it has neither loose nor ragged edges. If this precaution be not observed, portions of a ragged sponge may be left in the abdominal cavity, where they may cause serious trouble.

The sponges are put into a bag, and the first part of the preparation begins with the loosening of all sand from the tissue of the sponge. This is done by beating the bag upon a table. A nurse cannot take

too much trouble over this, as it is astonishing what a quantity of sand and small stones they contain. As this is not all got rid of by the beating process, the sponges are now washed over and over again in warm water. After this they are put into a glass or china jar containing a solution of hydrochloric acid (half an ounce to a quart of water) and left there for a period of twenty-four hours. They are then removed from the acid, and left in running water for several hours, in order to get rid of every particle of sand.

Having satisfied herself that the sponges are thoroughly clean, the nurse will put them into a jar containing a solution of liquid ammonia of the strength of half an ounce to the quart of water, and leave them to soak for another twenty-four hours, after which they are washed in order to get rid of every trace of the solution.

They are now put into a steriliser or vessel with water sufficient to cover them, and brought slowly to a temperature of 180° Fahr. Great care must be taken that the maximum temperature of the water is never greater than 180° Fahr., as to go beyond this limit will mean the destruction of the elasticity of the sponge. They should be kept at this degree of heat for one hour, the nurse watching the thermometer closely.

The water is now allowed to cool, and then with thoroughly cleansed hands covered by sterile gloves

the sponges are wrung out of the water and dropped into a glass jar containing a 1-20 solution of carbolic in sufficient quantity to completely cover them. They are now put away until required. Before being used for an operation they must be rinsed in sterile water or normal saline to get rid of the carbolic.

If used for a septic or a malignant case, sponges should be at once destroyed. In ordinary cases the sponges are washed in cold water till all the blood, etc., has been removed. They are then soaked for twenty-four hours in a solution of ammonia, as already mentioned. From that point the preparation is continued as before.

To make **iodoform gauze**, the required quantity of white unfolded gauze in 3-yard lengths, together with a thin sheet, should be sterilised for half an hour by being subjected to the influence of steam at a pressure of 15 lbs. or more.

For every 3 yds. of gauze 6 drs. of iodoform powder,  $\frac{1}{2}$  an oz. of glycerine, and 6 ozs. of normal salt solution are required. These are put into a large basin which has been sterilised, and the nurse with cleansed hands covered by sterile rubber gloves rubs the ingredients round and round in the bottom of the basin with the palm of the right hand till they are well mixed together. Three yards of gauze is then placed in the solution, which is rubbed well into it. It is now lightly squeezed to get rid of any excess of moisture, and spread on a table which has been

covered by the sterile sheet. It is cut into the required widths, folded with the raw edges inside, and rolled. The rolls are prepared of different widths, varying from  $\frac{3}{4}$  in. to 4 ins., but all should, if possible, be of the same length, so that when used to pack a cavity, etc., the exact quantity of gauze employed is easily calculated. When cut and rolled, each length of gauze is put into a glass tube or beaker of a suitable size, which has previously been sterilised by boiling. A small pad of sterile wool is first put into the tube, then the roll of gauze, and the tube is corked by a tight plug of wool covered and tied on by a piece of white gauze. The wool absorbs any moisture which may accumulate in the tube during the process of sterilisation. The filled tubes are sterilised for twenty minutes at a pressure of *not more than 10 lbs. of steam*. Should the pressure rise to 15 or 20 lbs., the iodoform molecule is broken up with the liberation of iodine. The iodine freed in this way acts more powerfully than under ordinary circumstances and destroys the gauze, rendering it friable and completely useless for surgical purposes.

Moist gauze prepared in this way is much more easily manipulated than that prepared dry, and the disagreeable odour of the iodoform is hardly recognisable.

For ordinary dressings, etc., the gauze prepared as above can be covered by a piece of calico for sterilisation instead of being put into tubes, but for use in the

abdominal or uterine cavities it should be sterilised in tubes, which are not opened until the gauze is required.

A convenient drain is made by rolling a piece of prepared gutta-percha tissue round a length of sterile iodoform gauze. This constitutes the so-called "cigarette drain."

**Adhesive iodoform gauze** is made by saturating sterile, white gauze in a solution of

Iodoform powder	.	.	6	drs.
Resin	.	.	2½	drs.
Glycerine	.	.	1½	drs.
Alcohol	.	.	7	drs.

A piece of folded gauze of the required size is saturated in the solution just before being applied. This is a useful dressing for a clean wound. It possesses the advantages of being antiseptic, porous and adhesive. A little turpentine will readily remove any of the solution which may adhere to the dresser's fingers.

**Repair of Rubber Gloves.**—Before sterilising gloves for an operation, the nurse must be sure that they are quite whole. Even the smallest aperture renders a glove quite useless for an operation. If any holes exist, therefore, they must be carefully patched. Pieces of an old glove no longer of any use answers quite well for this purpose. A piece a little larger than the hole is cut and rubbed over first with



benzoin and then with fine sandpaper. A small area round the hole is treated in the same way and then painted with rubber cement. The prepared patch is placed over the hole, and glove and patch are pressed tightly together. A little talc powder is then rubbed over the repaired surface.

**Gutta-percha tissue** is prepared by laying a large piece on a table and scrubbing both sides of it with a solution of green turpentine soap, using a nail-brush. It is then rinsed in cold sterile water, cut into the required sizes, and put into a sterile glass jar with corrosive lotion (1-1000) in sufficient quantity to cover it. In three days it is ready for use.

**Rubber tubing** for drainage should be prepared by scrubbing with a solution of green turpentine soap, allowing some of the solution to run through it. It is then rinsed in water, boiled for fifteen minutes, and put into a sterile glass jar with carbolic (1-40).

**Vaseline, talc powder, boric powder, etc.,** may be conveniently sterilised in small glass beakers or bottles which are put into the dressing steriliser and subjected to the influence of steam at a pressure of 15 or 20 lbs. for half an hour.

**Preparation of Sutures and Ligatures.**—**Silk-worm-gut and Horsehair** are sterilised by boiling for ten minutes in plain water; they are then transferred with sterilised forceps to a solution of carbolic (1-20) in which they are kept immersed.

Before being used they are placed for a few seconds in sterile water to remove the antiseptic.

These materials are frequently used for suturing the skin; silkworm-gut is not infrequently employed for "through-and-through" sutures, *i.e.*, to include the skin and deeper tissues as well.

**Silk.**—The preparation of silk as recommended by Kocher is as follows:—(1) Soak in ether for twelve hours; (2) soak in alcohol for twelve hours; (3) boil for ten minutes in 1-1000 corrosive sublimate solution; (4) wind with clean hands round glass spools; (5) spools boiled for ten minutes in 1-1000 corrosive solution just before the operation; (6) hand out of the sublimate solution in which it is boiled.

Silk is chiefly used for ligatures.

**Catgut.**—Catgut is largely used for ligatures and the deeper sutures. A large number of different methods have been devised for the preparation and sterilisation of catgut. The following methods have been found satisfactory.

*Formalin Method.*—

(1) Soak the raw catgut in ether for twelve to twenty-four hours according to the thickness of the gut; this dissolves out the fat.

(2) Soak in 4 per cent. formalin solution for forty-eight hours (for thin) or seventy-two hours (for thick).

(3) Remove the formalin by soaking for twenty-four hours in water.

(4) Cut into 18-in. lengths, each of which is rolled on glass spool. The spools are boiled in water for four or five minutes, and then transferred by means of sterile forceps to

(5) Absolute alcohol, in which the gut is stored.

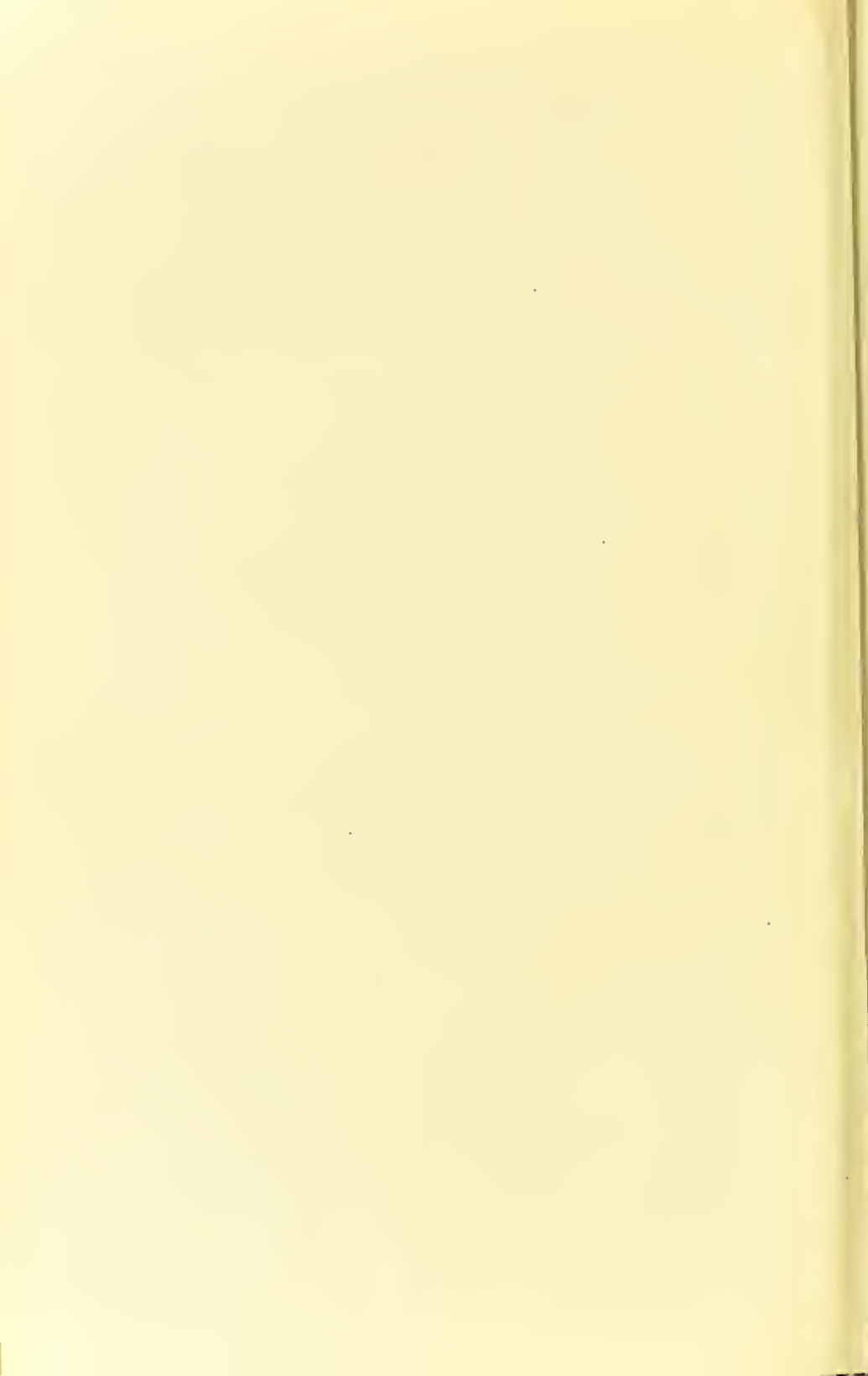
Before use the catgut is removed with sterile forceps from the alcohol to sterile water, in which it is left for a few minutes.

*Iodine Method.*—In this method the catgut is sterilised by being soaked for some days in a solution of iodine. The best iodine solution consists of:

Tincture of Iodine, 1 part.

Proof Spirit, 15 parts.

After soaking for eight days in this solution the catgut is thoroughly sterilised. It can without harm be stored in the same solution.



## GLOSSARY

- Abortion**—Escape of fœtus from the uterus in the earlier months of pregnancy.
- Amenorrhœa**—The condition of absence or scantiness of the menstrual flow between puberty and the menopause.
- Anteflexion**—Bending forwards of body of uterus on cervix.
- Anteversion**—Tilting forwards of uterus as a whole.
- Atresia**—Occlusion of any part of the genital canal.
- Cœliotomy**—Operation in which peritoneal cavity is opened.
- Colpitis**—Inflammation of the vagina.
- Colporraphy**—Operation for tightening lax vaginal wall—either anterior or posterior.
- Colpotomy**—Opening peritoneal cavity through the vaginal roof.
- Cystitis**—Inflammation of bladder.
- Cystocele**—Downward displacement or prolapse of the bladder through the vaginal orifice.
- Cystoma or Cyst**—Sac filled with fluid.
- Dermoid Cyst**—Cyst containing fatty material and frequently hair ; often met with in ovary.
- Dysmenorrhœa**—Painful menstruation.
- Ectopic Gestation**—Pregnancy occurring outside the uterus, usually in Fallopian tube.
- Endometritis**—Inflammation of mucous membrane lining the uterus.
- Extra-uterine Gestation**—*See* Ectopic Gestation.
- Fibroid Tumour**—Fibro-muscular tumour, usually in uterus.

- Fibro-Myoma**—*See* Fibroid Tumour.
- Flooding**—Excessive escape of blood from vagina.
- Hæmatocele**—Collection of blood, usually encysted, in peritoneal cavity; due in large number of cases to ruptured extra-uterine pregnancy.
- Hæmatoma**—Collection of extravasated blood.
- Hæmato-Salpinx**—Collection of blood in Fallopian tube.
- Hermaphrodite**—Individual possessing genital organs of both sexes
- Hydro-Salpinx**—Collection of clear fluid in Fallopian tube.
- Hysterectomy**—Removal of uterus, which may be performed either by the abdominal or the vaginal route.
- Hystero-salpingo-Oophorectomy**—Removal of uterus with Fallopian tubes and ovaries.
- Inversion of Uterus**—Condition in which uterus is turned inside out.
- Involution**—Process of diminution in size of uterus after labour.
- Kraurosis Vulvæ**—Chronic inflammatory condition of vulva associated with severe pain and irritation.
- Laparotomy**—Operation in which peritoneal cavity is opened.
- Leucorrhœa**—Whitish discharge from vagina.
- Menopause**—Time of normal cessation of menstruation, usually from 45 to 50.
- Menorrhagia**—Excessive menstrual discharge.
- Menstruation**—The normal monthly escape of blood from genital track.
- Micturition**—Process of passing urine.
- Myoma**—Muscular tumour, usually of uterus.
- Myomectomy**—Excision of muscular or fibro-muscular tumour of uterus, the uterus being left.
- Nabothian Follicles**—Cysts which develop in the cervix as the result of chronic cervicitis, with obstruction of the gland ducts.
- Oophorectomy**—Operation for removal of ovary.
- Oophoritis**—Inflammation of ovary.
- Os externum**—Aperture by which cervix opens into vagina.
- Os internum**—Narrowed portion of uterine canal, where cervix and body of uterus become continuous.
- Ovariectomy**—Operation for removal of ovarian tumour.

- Ovaritis**—Inflammation of ovary.
- Ovulation**—Periodic discharge of ova from ovary.
- Ovum**—The egg or germ-cell which is discharged from the ovary along the Fallopian tube.
- Parametritis**—Inflammation of cellular tissue surrounding the uterus.
- Parovarian Cyst**—Cyst which develops in the parovarium, which consists of body comprised of series of tubules lying between layers of broad ligament.
- Pedicle**—Stalk or neck by means of which an organ or a tumour of an organ is attached.
- Perimetritis**—Pelvic peritonitis.
- Perineorrhaphy**—Operation for repair of perineum.
- Polypus**—Tumour with stalk growing into the lumen of a canal, *e.g.* uterus.
- Pouch of Douglas**—Peritoneal pouch behind uterus and upper part of vagina.
- Procidentia**—Complete prolapse of uterus.
- Prolapsus Uteri**—Downward displacement of uterus.
- Pruritus Vulvæ**—Disease associated with severe itching of external genitals ; often due to diabetes.
- Pudenda**—External genitals.
- Pyo-Salpinx**—Collection of pus in Fallopian tube.
- Rectocele**—Displacement downwards of rectum through the vaginal orifice.
- Retroflexion**—Bending backward of body of uterus on cervix.
- Retroversion**—Tilting backwards of uterus as a whole.
- Retroverted or Retroflexed Gravid Uterus**—Backwardly displaced uterus which is pregnant.
- Salpingitis**—Inflammation of Fallopian tube.
- Salpingo-Oophorectomy**—Removal of Fallopian tube and ovary.
- Salpingo-Oophoritis**—Inflammation of Fallopian tube and ovary.
- Souffle (Uterine)**—Blowing sound heard with stethoscope, due to blood rushing through dilated uterine vessels ; heard in pregnancy and some fibroid tumours.
- Stenosis of Cervix**—Narrowing of cervical canal.
- Sub-involution**—Imperfect involution of the uterus.
- Super-involution**—Excessive involution of uterus, the uterus being reduced in size.



**Trachelorrhaphy**—Repair of lacerated cervix.

**Urethritis**—Inflammation of urethra.

**Uterine Appendages**—Fallopian tubes and ovaries.

**Vaginismus**—Contraction of tissues at vaginal orifice associated with pain.

**Vaginitis**—Inflammation of vagina.

**Vesico-vaginal Fistula**—Abnormal opening between bladder and vagina.

**Vicarious Menstruation**—Escape of blood from region other than uterus, corresponding to period of menstrual flow, *e.g.* nose.

# INDEX

## A

Abdominal examination, 58  
 Abdominal facies, 298  
 Abdominal section, 208  
   after-treatment of, 247  
   complications after, 284  
   instruments for, 208  
   preparation of bed of patient,  
     225  
   preparation of patient for, 214  
   preparation on operating  
     table, 224  
   rubber gloves for, 214  
   swabs, etc., for, 213  
   wound, care of, 276  
 Abdomino-recto-vaginal exam-  
   ination, 71  
 After-treatment of abdominal  
   section, 247  
   curettage, 184  
   perineal repair, 187  
   vaginal hysterectomy, 207  
   vesico-vaginal fistula repair,  
     191  
 Alexander - Adams operation,  
   163

321

Anæsthesia sickness, 251  
 Anal orifice, 8  
 Antelexion, 154  
   exaggerated or acute, 155  
 Anteversion, 154  
 Antisepsis, 41  
 Anti-streptococcic serum, 301  
 Anus, 6  
 Ascites, 61  
 Asepsis, 41  
 Auscultation, 61  
 Auvard's self-retaining specu-  
   lum, 16

## B

Bacillus Coli communis, 35  
   tuberculosis, 35  
 Barnes' cup-and-stem pessary,  
   169  
 Bartholinian glands, 62  
 Belt, abdominal, 281  
 Bimanual examination, 22, 68  
 Bladder, 9, 10, 11, 56, 57  
   care of, after abdominal sec-  
     tion, 255  
   disease, urine in, 116

X

- Bladder, displacement of, 117  
 examination of, 116  
 inspection of, 117  
 inspection of interior of, 118  
 palpation of, 117  
 percussion of, 117  
 sound, 118
- Blistering, 104
- Broad ligaments, 13
- C
- Caps, operating, 213, 302, 303
- Carcinoma of uterus, 201
- Casket for dressings, 52, 54
- Catgut, preparation of, 314  
 formalin method, 314  
 iodine method, 315
- Cathcart's appliances for swab  
 counting, 213, 241
- Catheter, use of, 109  
 winged or self-retaining, 196
- Cervix, 11  
 vaginal portion of, 11
- Clamp forceps, broad ligament,  
 205, 208
- Clitoris, 7
- Clover's crutch, 178
- Coccyx, 5
- Colporrhaphy, 169, 185
- Complications after abdominal  
 section, 284
- Curettage, 180  
 in gonorrhœa, 152
- Curette, 26  
 flushing, 27  
 loop, 27  
 Martin or Recamier-Roux, 26
- Cusco's bivalve speculum, 18, 19
- Cystitis, irrigation of bladder  
 in, 130
- Cystocele, 63, 165
- Cystoscope, 119  
 electric, 119  
 Kelly, 119
- D
- Dilators, 24  
 Ellinger's, 25, 26  
 Goodell's, 25, 26  
 Hegar's, 24,  
 Sims' or duckbill, 25
- Displacements of uterus, 154  
 backward, 157  
 downward, 164  
 forward, 155
- Dorsal posture, 78
- Douche, in gonorrhœa, 149  
 intra-uterine, 99  
 syphon or "rotunda," 87  
 vaginal, 84
- Douching and plugging in  
 fixed retroversion, 163
- Doyen's volsellum, 204
- Drainage tube, self-retaining,  
 295
- Draw-sheet, 225
- Dressings, sterilisation of, 50
- E
- Elevated or exaggerated lith-  
 otomy posture, 82
- Ellinger's dilator, 25
- Enema, flatus, 262  
 nutrient, 269  
 turpentine, 263

Examination, abdominal, 58  
     bimanual, 59  
     of bladder, 116  
     of breasts, 59  
     of external genitals, 59  
     rectal, 59, 137  
     rectal bimanual, 59  
     recto-vaginal bimanual, 59  
     vaginal, 59, 63  
 External organs of generation, 7  
 External sphincter, 9

## F

Fallopian tubes, 6, 13  
 Feeding of patient after abdominal section, 265  
 Fenton's metal dilators, 25  
 Ferguson or tubular speculum, 17  
 Fever, 38  
 Fibroid tumour, 67, 68, 71, 200  
 Flatulent distension of bowels after abdominal section, 262  
 Flatus enema, 262  
     passage of, after abdominal section, 260  
     tube, 263  
 Flushing curette, 27  
 Fly blister, 104  
 Fritsch's intra-uterine catheter, 28, 100  
 Fundus uteri, 11

## G

Genu-pectoral position, 83  
 Gloves, 42

Gonococci, 34, 146  
 Gonorrhœa, 62, 146  
 Gonorrhœal cystitis, silver nitrate in, 131  
 Goodell's dilator, 25  
 Gowns, operating, 213, 302, 303  
 Gutta-percha tissue, 313  
 Gynæcological examination, methods of, 59  
     instruments for, 14  
 Gynæcological positions, 78  
     dorsal, 78  
     elevated or exaggerated lithotomy, 82  
     knee-chest or genu-pectoral, 83  
     left lateral, 80  
     lithotomy, 82  
     Sims' or semi-prone, 80  
     Trendelenburg, 83

## H

Hæmorrhage after abdominal section, 284  
     signs and symptoms of, 286  
     treatment of, 288  
 Hectic fever, 292  
 Hegar's dilators, 24  
 Henry's solution, 262  
 Hernia, ventral, 282  
 Higginson's syringe, 87  
 Horse-hair, 313, 314  
 Hymen, 8  
     rupture of, 57  
 Hysterectomy, abdominal (see Abdominal section), 208  
     vaginal, 200

## I

Ilium, 2  
 Inflammation, 36  
 Innominate bones, 2  
 Instrument clerk, duties of, 242  
 Instruments, care of, after operation, 48  
     sterilisation of, 46  
 Internal organs of generation, 9  
 Iodoform gauze, preparation of, 310  
 Iodoform gauze, adhesive, 312  
 Irrigation of bladder, 130  
     of peritoneal cavity, 212, 243  
 Ischium, 2

## K

Keith's glass drainage tube, 210  
 Kelly's method of bladder inspection, 119  
     inspection of rectum, 140  
 Kelly's pad, 176  
 Knee-chest position, 83  
 Knives, sterilisation of, 48

## L

Labia majora, 7  
     minora, 7  
 Laparotomy sheet, 305  
 Left lateral position, 80  
 Leucocytes, 37  
 Levator ani, 4  
 Ligatures, preparation of, 313  
 Linea nigra, 60  
 Lithotomy posture, 16, 82, 177  
     sheet, 305

Loop curette, 26  
 Luy's urine separator, 128

## M

Malignant disease of uterus, 201  
 Martin or Recamier-Roux  
     curette, 26  
 Masks, for operation, 213, 312  
 Menstrual flow, 12  
     period, 12  
 Menstruation, 58  
 Micro-organisms, 33  
 Minor operations, preparation  
     for, 170  
 Mons veneris, 7  
 Myoma screw, 30, 210

## N

Nail brushes, 43  
 Nails, care of, 43  
 Napier's pessary, 169  
 Needle holder, 209  
 Needles, sterilisation of, 48  
 Nutrient enema, 269

## O

Operating room, 228  
     table in hospital, 232  
     table in private house, 229  
 Operating theatre, 230  
     care of, 230  
     temperature of, 231  
 Operation, care of swabs during,  
     238  
     duties of assistants during, 238  
     in a private house, 228

Organs of generation, 1  
     external, 1, 7  
     internal, 1, 9  
 Os, external, 12  
 Ovary, 6, 13  
     prolapse of, 68  
 Ovum, 12  
 Oxalic acid, 44

## P

Pain after abdominal section,  
     272  
 Palpation, 61  
 Pedicle forceps, 32  
     needle, 31  
 Pelvic cavity, 5  
     floor, 6  
     inlet, 4  
     outlet, 6  
 Pelvis, 2  
     brim of, 3  
     contents of, 6  
     false, 4  
     true, 4  
 Peptonised food, 268  
 Perineorrhaphy, 169, 185  
 Perineum, anatomy of, 8  
 Peritoneum, anatomy of, 10  
 Peritonitis, 13  
     gonorrhœal, 147  
     septic, 297, 299  
 Permanganate of potash, 44  
 Pessaries, 160  
     Albert Smith, 161  
     Barnes', 169  
     Hodge, 160  
     Napier's 169  
     Pessaries, precautions in use of,  
         161  
     ring, 167  
 Plugging in gonorrhœa, 149  
     vaginal, 94  
 Pouch of Douglas, 10, 67  
 Pregnancy, 61  
 Preparation for examination of  
     patient, 71  
 Proctoscope, 140  
 Prolapse of ovary, 68  
 Prolapsus uteri, 63, 164  
     treatment of, 166  
 Promontory of the sacrum, 5  
 Pubis, 2  
 Purgative after abdominal sec-  
     tion, 264  
 Pus-forming organisms, 34  
 Pyo-salpinx, 68

## R

Rectal bimanual examination,  
     71  
     examination, 71  
     feeding, 268  
 Rectum, 6, 9, 10, 56, 57  
     digital examination of, 138  
     inspection of, 139  
     palpation of, 137  
 Repair of perineum, 185  
 Retroflexion, 157  
 Retroversion, 157  
 Ring pessary, 167  
 Rubber gloves, 42, 44, 214  
     repair of, 312  
     sterilisation of, 45, 46  
 Rubber tubing, 313

## S

- Sacro-sciatic ligaments, 5
- Sacrum, 5
- Sepsis, 37
  - after abdominal section, 290
- Septic wound, precautions in
  - dressing, 42, 294, 295
- Sheet, laparotomy, 305
  - lithotomy, 305
- Shock after abdominal section, 248
  - treatment of, 249, 251
- Shortening of round ligaments,
  - operation for, 163
- Sickness, anæsthesia, 251
- Sigmoidoscope, 145
- Silk, preparation and sterilisation of, 55, 314
- Silkworm-gut, preparation of, 313, 314
- Sims' dilator, 25
  - or duckbill speculum, 14
  - or semi-prone position, 80
  - posture, 15
- Skin, care of, after abdominal section, 275
- Sleeplessness after abdominal section, 275
- Sponges, sea, 308
  - preparation of, 308-310
- Square for abdomen, 307, 308
- Staphylococci, 34
- Steam sterilisation, 50
  - at the ordinary pressure, 53
  - under pressure, 50
- Sterilisation, 41
  - of dressings, 51
  - of hands, 42

- Sterilisation of water, 54
- Steriliser, 46, 47
- Stitch abscess, 280
- Stockings for operation, 304, 305
- Streptococci, 34
- Striæ gravidarum, 60
- Sutures, preparation of, 313
- Swabs, care of, 238
  - cleansing of, 308
  - preparation of, 306
- Symphysis pubis, 2
- Syphilis, 63

## T

- Tampon, vaginal, 94
- Thirst after abdominal section, 254
- Thyroid foramen, 5
- Toxines, 37
- Transfusion of saline solution, 212, 244
  - for hæmorrhage, 289
  - instruments for, 245
- Trendelenburg position, 83, 234
- Trochar and canula, 30, 31, 210
- Tubal pregnancy, 68
- Turpentine enema, 263

## U

- Ureteral bougies in hysterectomy, 206
  - catheter, 121
  - probe, 121
- Ureters, examination of, 127



- Urethra, 6, 8, 10  
Urethral calibrator, 120  
    caruncle, 63  
    orifice, 6  
Urine evacuator, 121  
    pan for vesico-vaginal fistula  
        case, 147  
        separator, 128  
Uterine catheter, 28  
    forceps, 27  
    souffle, 62  
Uterine sound, method of introduction, 23  
    precautions in use of, 23  
    Sir A. R. Simpson's, 21  
    Sir J. Y. Simpson's, 22  
    uses of, 22  
Utero-sacral ligaments, 67  
Uterus, 6, 10, 11  
    body of, 11  
    displacements of, 154  
    length of, 12  
    normal position of, 154
- V  
Vagina, 6, 10, 12  
Vaginal dilators, 29  
    discharge, 58  
    douche, 84  
    examination, 57, 63  
    hysterectomy, 200  
    orifice, 6, 8  
    perforator, 29, 209  
    portion of cervix, 66  
    retractor, 19, 205  
    specula, 14  
Ventral fixation, 164  
    suspension, 164  
Vesico-vaginal fistula, 191  
Vestibule, 8  
Volsellum, 20, 21  
    Doyen's, 204
- W  
Winged catheter, 196, 197

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